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(54) Title: SYSTEMS AND METHODS FOR RELATIVE MESSAGE ADDRESSING

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(57) Abstract: The invention provides exemplary systems and methods for sending mail messages. In one method, a relative delivery address is composed which is associated with at least one recipient. A message is associated with the relative delivery address. The relative delivery address is resolved to an absolute mail address for each recipient, and the message is sent to each absolute delivery address.

SYSTEMS AND METHODS FOR RELATIVE MESSAGE ADDRESSING

CROSS REFERENCE TO RELATED APPLICATIONS

5   This application is a continuation in part application of U.S. Patent Application Serial No. 09/329,669, filed June 10, 2000, the complete disclosure of which is herein incorporated by reference.

BACKGROUND OF THE INVENTION

10   This invention relates generally to the field of mail or message delivery, and in particular to the delivery of electronic mail, commonly referred to as e-mail, as well as other types of messages. More specifically, in one embodiment the invention relates to the delivery of e-mail or other types of messages which utilize a relative mail or other relative delivery address.

15   Throughout the world, Internet e-mail is rapidly becoming a popular way to send messages. When a sender desires to send a message to a recipient, the sender must enter the e-mail address of the recipient into the sender's computer. Internet e-mail address are composed of the user's account ID followed by an at-sign "@". The name of their assigned mail server follows the at-sign which is then followed by a top level

20   domain, such as .com, .org, and the like. Presently, the name of the assigned mail server is referred to as the domain name. For personal accounts, the domain name is generally the name of their Internet Service Provider. For corporate employees, the domain name is usually related to the company name. Typically, the domain name bears no relationship to the individual's name nor his or her physical location or residence. For example, Tom

25   Smith, an employee of company XYZ, Inc. may have an e-mail address of: TSmith@XYZ.com. In this example, TSmith is the account ID for Tom Smith and XYZ is the domain name of XYZ, Inc.

E-mail addresses of the types described above can be generally referred to as absolute e-mail addresses. This designation is given because the destination address

30   specifies an exact destination regardless of the sender's address. Absolute mail addresses are also used with traditional mail. For example, to mail a letter to Tom Smith at XYZ, Inc., the letter would be addressed with the name of Tom Smith and the mailing address

of XYZ, Inc. If both these pieces of information are missing, it will be difficult, if not impossible, to correctly deliver the piece of mail.

One problem associated with the use of absolute e-mail addresses is that they are prone to change, thus making it difficult for senders to maintain an accurate list

5   of recipient addresses. For example, many families now find it convenient to communicate by e-mail. However, as family members switch internet services providers, e.g., to obtain better rates or service, they change employment, or their e-mail address changes for other reasons, it becomes difficult to maintain an accurate list of addresses.

In an attempt to address this problem, a variety of electronic address book

10   programs have been proposed. For example, many e-mail client programs, such as Eudora, Netscape, or Microsoft Outlook include an address book feature. However, these address books are complicated and it remains the responsibility of each individual to keep his or her address book current.

Problems relating to address changes are not limited to e-mail systems.

15   For example, individuals telephone numbers often change. Further, with the advent of a host of new communication devices, such as mobile phones, digital-assistants, facsimiles, and the like, the chances of changing one or more phone numbers over time is likely.

Hence, it would be desirable to provide a way to facilitate the sending of mail which would overcome or greatly reduce the problems associated with previous

20   attempts. In particular, it would be desirable to provide systems and methods for delivering mail where an absolute address for the recipient was not needed. In this way, mail could be delivered to one or more recipients without knowing each absolute mail address, thereby eliminating the need to keep detailed and up-to-date records of the absolute mail address for each recipient. Further, it would be desirable to apply such

25   techniques to other communication devices when sending messages, or when communicating live using such devices.

SUMMARY OF THE INVENTION

The invention provides exemplary systems and methods for sending mail

30   messages. According to one exemplary method, a relative delivery address, such as a relative mail address, that is associated with at least one recipient is composed. A message is associated with the relative delivery address, and the relative delivery address is resolved to an absolute delivery address for each recipient. Such an absolute delivery address may comprise, for example, a recipient's e-mail address or phone number. Once

the absolute delivery address has been identified, the message is sent to each absolute delivery address. In this way, the message may be sent without requiring the sender to compose an absolute delivery address for each recipient.

In one particular aspect, a set of names is provided, with each name having an associated absolute mail address or phone number and at least one relationship identifier indicating a relation with one or more of the names in the set. The relative delivery address composed by the sender preferably includes a relationship identifier so that the relative delivery address may be resolved to the absolute mail address or phone number by identifying one or more recipients based at least in part on the sender's name and the relationship identifier.

In one particular aspect, each name in the set of names is associated with at least one common relative. In this way, the relative delivery address may be resolved to an absolute mail address or phone number by identifying one or more recipients based at least in part on the common relative and the relationship identifier in the relative delivery address. Conveniently, the common relative may be a blood relative, such as a parent. Further, the relationship identifier may include an identification of the recipient's gender. In this way, the recipient or recipients may be inferred by utilizing the common relative. For example, a sender may wish to send a message to a relative delivery address which uses "sister" as the relationship identifier. The sender's sisters may then be identified by first identifying all siblings which have the same parent as the sender. The females in the potential recipient group are then identified as the recipients which are to receive the message.

In still another aspect, the relative mail address is an e-mail address which includes the relationship identifier as well as a mail resolution server identifier. The message is then sent to a mail resolution server which is identified by the mail resolution server identifier. The mail resolution server may then be employed to resolve the relative mail address into one or more absolute mail addresses.

In still yet another aspect, the relative delivery address may be resolved into an absolute mail address by identifying a candidate set of names that are associated with the sender. Members of the candidate set are identified which have a relationship with the sender that is the same as the relationship identified by the relationship identifier. Conveniently, the relationship identifier may be a key word, a name, or the like.

In one aspect, the relative delivery address as well as a textual message may be entered into a mobile phone. The relative delivery address and the message are

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wirelessly transmitted from the mobile phone to a message transfer server which

determines a phone number for a phone of the recipient. The message is the sent from the

message transfer server to the recipient phone. Optionally, the message may be in the

form of a first media type, and the message may be transformed to a second media type

5   prior to sending the message to the absolute delivery address. In another aspect, the

recipient may have multiple absolute delivery addresses that are associated with different

communication devices, and the relative delivery address may be resolved to at least

some of the multiple absolute delivery addresses. In still another aspect, the name of each

recipient and the associated absolute delivery address may be displayed, such as on a

10   display screen of a mobile phone, prior to sending the message.

The invention further provides an exemplary system to facilitate the

sending of a message between a sender and a recipient using a relative mail address. The

system comprises a resolution server which is configured to receive a transmitted

message having a relative recipient mail address from a sender mail server and to forward

15   the message to a recipient mail server. The relative recipient mail address includes a

relationship between the sender and the recipient. The system further includes code to

resolve the relative recipient mail address associated with the message to a recipient

absolute mail address. Code is also provided to forward the message to the recipient's

mail server based on the recipient absolute mail address. In this way, a sender may send a

20   message to one or more recipients without knowing the recipient's absolute mail address.

To do so, the user simply composes a relative recipient mail address and then sends the

address to the mail resolution server.

In one particular aspect, the system further includes code to extract an

absolute mail address of the sender from the message received by the mail resolution

25   server. Code is also provided to resolve the relative recipient mail address associated

with the message to the recipient's absolute mail address based on the sender's absolute

mail address and the relationship recited it in the relative recipient mail address.

Preferably, the system utilizes a database that is associated with the mail resolution

server. The database has fields for storing names, associated absolute mail addresses and

30   relationships between the names.

The invention further provides an exemplary computer readable medium

which contains a program for reading a relative address. The program includes the steps

of reading a relative delivery address which is associated with at least one recipient, and

receiving a message which is associated with the relative delivery address. The program

further includes the steps of resolving the relative delivery address to an absolute delivery address for each recipient, and of sending the message to each absolute delivery address. For example, the program may be used to determine a recipient's e-mail address or phone number.

5   In yet another embodiment, the invention provides an exemplary computer data signal which is embodied in a carrier wave. The signal comprises a mail address having a relationship identifier and a mail resolution server identifier. The signal further includes a message associated with the mail address.

          In one particular embodiment, a system is provided to facilitate the

10   sending of a message between a sender and a recipient using a relative delivery address. The system comprises a resolution server for receiving from a sender communication device a transmitted message having a relative recipient delivery address. The resolution server is also configured to forward the message to a recipient communication device. The relative recipient delivery address includes a relationship between the sender and the

15   recipient, and code is provided to resolve the relative recipient delivery address associated with the message to a recipient absolute delivery address. Code is also provided to forward the message to the recipient's communication device based on the recipient absolute delivery address. For example, the sender communication device and the recipient communication devices may comprise mobile phones, and code may be

20   provided to resolve the relative recipient delivery address to a phone number of the recipient phone so that the message may be sent to the recipient phone.

          In another embodiment, a method is provided for sending a message. According to the method, a communication device of an initiating individual is used to compose (or to permit the entry of) a relative delivery address which is associated with at

25   least one receiving individual. The relative delivery address is resolved to an absolute delivery address for a communication device of the receiving individual. A connection is then established between the initiating individual and the receiving individual using the communication devices to permit real time or live communication between the individuals.

30   In one aspect, the address composing step comprises entering the relative delivery address into a mobile phone of the initiating individual. Conveniently, the mobile phone may include a web browser which produces an entry page to facilitate entry of the relative delivery address. The relative delivery address may be wirelessly

transmitted from the mobile phone to a directory server which determines a phone number for a phone of the recipient. The recipient phone number may then be sent to the initiator phone which dials the recipient phone number to establish the connection.

In an alternative aspect, the relative delivery address may be transmitted from the phone of the initiating individual to an interactive voice response system having a directory server using a public switched telephone network. A phone number for the phone of the recipient may then be determined using the directory server, and a command may be sent from the directory server to the public switched telephone network to establish the connection between the recipient phone and the initiator phone.

The invention further provides a system to facilitate the communication between a sender and a recipient using a relative delivery address. The system includes a directory server which is adapted to receive from a sender communication device a relative recipient delivery address that is associated with a recipient communication device. The relative recipient delivery address includes a relationship between the sender and the recipient. Code is provided to resolve the relative recipient delivery address to a recipient absolute delivery address, and to send the absolute delivery address to a communication mechanism to establish a communication link between the sender communication device and the recipient communication device.

In one embodiment, the initiator communication device and the recipient communication device each comprise phones, and code is provided to resolve the relative recipient delivery address to a phone number of the recipient phone. Conveniently, the communication mechanism may comprise the initiator phone, and code may be provided to send the recipient phone number to the initiator phone to establish a wireless connection between the initiator phone and the recipient phone. Alternatively, the communication mechanism may comprise a public switched telephone network, and code may be provided to send the recipient phone number to the public switched telephone network to establish the connection.

In another embodiment, the invention provides a communication device that comprises a mobile phone having an entry device, a display screen and a web browser. The mobile phone is configured to send a relative delivery address to a server and to establish a connection with recipient phone upon receipt of a recipient phone number from the server.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram of an exemplary system to facilitate the sending of electronic mail according to the invention.

Fig. 2 is a flow chart illustrating an exemplary method for processing electronic mail which utilizes a relative mail address according to the invention.

Fig. 3 is a flow chart illustrating an exemplary method for resolving a relative mail address to an absolute mail address according to the invention.

Fig. 4 is a schematic diagram illustrating a set of names in a database and how they relate to each other according to the invention.

Fig. 5 is a schematic diagram of a system to facilitate the wireless sending of messages according to the invention.

Fig. 6 is a schematic diagram of a system to provide live communication between to communication devices according to the invention.

Fig. 7 is a schematic diagram of an alternative system to provide live communication between to communication devices according to the invention.

Fig. 8 illustrates the system of Fig. 7 when conferencing multiple telephones according to the invention.

DETAILED DESCRIPTION OF THE SPECIFIC EMBODIMENTS

The invention provides for the sending of mail or other messages of various media types to one or more recipients without requiring the sender to specify an absolute delivery address for each recipient. For example, when sending a traditional paper mail message, an absolute mail address is required which lists the recipient's name, residential address or P.O. box, city, state, country and zip or postal code. For e-mail addresses, the absolute mail address typically includes the user's account ID followed by their assigned mail server and a top level domain as previously described. For phones, digital assistants, pagers, and the like, absolute addresses are phone numbers. The invention eliminates the need for such absolute delivery addresses to be provided by the sender in order to properly deliver a message or establish a communication link.

Although useful with essentially any type of mail or message, the invention will find particular use with electronic mail, or e-mail, which is sent over a network, including the Internet, local area networks, wireless networks, and the like. The invention will also find use in delivering messages to other communication devices, such as phones, including traditional phones, mobile phones, pagers, and the like. The invention may also be used

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to establish a communication link between two or more communication devices using a relative delivery address to permit live communication, such as a conversation between two or more individuals over a phone.

According to one embodiment of the invention, mail or other messages are

5   addressed using a relative delivery address, such as a relative mail address, which is later resolved into an absolute address for each recipient. A relative delivery address is an address which is used to define on or more recipients without specifying an absolute delivery address of the recipients. For example, a relative mail address may utilize a relationship identifier which is used to identify one or more recipients. Conveniently, the

10   relationship identifiers may be used to figuratively represent sets of one or more recipients. Examples of possible relationship identifiers include key words or names, such as first names or nicknames, friends, family, siblings, brother, sister, neighbor, co-workers, and the like. As described in more detail hereinafter, the invention is able to associate the relationship identifier with absolute addresses, such as mailing address,

15   phone numbers, or the like, of recipients which belong to the relationship set, i.e., to resolve the relative address to one or more absolute addresses. In this way, the sender need not keep an accurate or updated list of absolute addresses for each recipient. Instead, the sender simply composes a relative delivery address using an intuitive or suggestive relationship identifier, e.g., friend, and the invention resolves the relative

20   address to the absolute address of each friend of the sender.

To conform with existing Internet procedures relative to domain names, the relative mail addresses preferably include a relationship identifier which identifies a desired name set, e.g., friend, followed by an at-sign, and further followed by the domain name of the server which is to receive the mail associated with the relative mail address.

25   Such a server is referred to as a mail resolution server. The mail resolution server resolves the relative address to one or more absolute mail addresses, and then transmits the mail to the appropriate recipient servers which will ultimately deliver to mail to the identified recipients. A similar process may be used with other communication devices. For example, mobile phones that include micro web browsers may use relative delivery

30   addresses that include a relationship identified following by the domain name of the server that is able to communication with a mobile phone. As another example, for mobile phones that include short message services, a relative address may be sent to a message relay server that resolves the address to a phone number of the recipient. As still another example, access to a resolution server may be accomplished through an

●   ●

interactive voice response unit. The relative delivery address may be tailored to the configuration of the interactive voice response unit.

To resolve the relative delivery address to one or more absolute addresses, the invention preferably takes advantage of a computerized database. The databases

5   employed by the invention store a list of names of potential recipients and their associated absolute mail addresses. A variety of searching techniques may then be employed to identify the recipients intended by the sender when composing the relative mail address. For example, each name in the database may be associated with a list of associated names and corresponding relationship identifiers. When the sender composes the relative

10   delivery address, the names associated with the sender are then searched to find those names who have the same relationship identifier included in the relative delivery address. For example, a sender, Art Able, may wish to send a letter to "brothers". The set of names associated with Art Able are then searched to determine which of the names have "brother" as their relationship identifier. Once these names have been identified, their

15   associated absolute addresses may be determined.

As another example, the intended recipient or recipients may be inferred based on an evaluation of the relationship identifier and one or more relatives which are common with both the sender and the potential recipients. The common relatives may be a common blood relative or other type of defined relationship. For example, the database

20   may be arranged so that every name is associated with one or more parents. With this arrangement, if Art Able sends a letter to "brothers", the database searches to determine the siblings of Art Able by identifying the names having the same parents. The male names are then chosen as the desired recipients.

Although the above searching techniques are provided as examples, it will

25   be appreciated that the invention is not intended to be limited to only those specific techniques. For instance, other searching techniques which may be used with a relationship identifier include those described in Donald E. Knuth, The Art of Computer Programming, Volume 3, Sorting and Searching, the complete disclosure of which is herein incorporated by reference.

30   Use of such computerized databases are advantageous in that they are able to easily accommodate changes in absolute addresses. In this way, if an individual changes his or her absolute address, the change may be sent to the database administrator to make the change in the database. In this manner, the individual will not need to send an additional notification to each of his or her normal recipients.

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In one particular embodiment, the invention utilizes email systems which are based on a "store and forward" architecture. In such a system, messages are stored on servers which periodically forward them to the next server in the chain. Typically, new messages are sent when a user's client computer connects to its designated mail server.

5   That mail server looks at the destination address associated with the message and, depending on a set of rules, determines to which server the message should be relayed. This process may repeat depending on conditions such as periodic connectivity, relay schedules, and bridges between different networks or mail transport protocols. Eventually, the mail arrives at the receiver's mail server where it is held until the

10   receiver's client computer connects to retrieve the messages.

The most prevalent mail transport protocols currently in use are SMTP (primary protocol on the Internet), X.400, and Novell MHS. The relative mail addressing of the invention is applicable to these as well as other store and forward protocols.

Referring now to Fig. 1, an exemplary system 10 to facilitate the sending

15   of electronic mail according to the invention will be described. Central to system 10 is an address resolution server 12 which sits between a sender's mail server 14 and a receiver's mail server 16. A sender's computer 18 is employed to send email messages to sender's mail server 14, and a receiver's computer 20 is employed to receive email messages from receiver's mail server 16. While only shown with one sender's mail server, one

20   receiver's mail server, one sender's computer, and one receiver's computer, it will be appreciated that system 10 may have any number of similar components which may communicate with address resolution server 12. However, for convenience and illustration, only the previously recited components are shown. Also for convenience of discussion, the computers in Fig. 1 are ordered according to how the email message

25   moves through system 10. In terms of network connectivity, however, it is probable that all machines are peers on the Internet.

When a sender desires to send an email message, the sender composes a message and uses a relative mail address. Typically, the message will be composed at sender's computer 18. The relative address composed by the sender includes the domain

30   name of address resolution server 12. When the user sends the message, computer 18 delivers the message to mail server 14, typically a server at the user's Internet service provider. Sender's mail server 14 forwards the message to address resolution server 12 according to the domain name portion of the address.

Upon receiving the message, address resolution server 12 resolves the relative address to an absolute address. Address resolution server 12 is in communication with a member account and relationship data base 22 which is employed to assist in resolving the relative address to an absolute address as described in greater detail

5   hereinafter. After the absolute address has been determined, address resolution server 12 forwards the message on to receiver's mail server 16 based on the domain name portion of the new absolute mail address.

Receiver's mail server 16 holds the message until the receiver uses computer 20 to retrieve the message. Hence, when composing a mail message in this

10   manner, the relative mail address is transparent to all mail servers in system 10 except for address resolution server 12.

The computers employed to send and retrieve email messages may be of any type of computer capable of communicating with an external device or computer as is known in the art. For example, computers which may be utilized with the invention

15   include commercially available Pentium-type desktop or laptop computers, Apple Macintosh Computers, Palm Computers, Personal Digital Assistants, and the like. Preferably, these computers include appropriate software which allows email messages to be composed and allows one or more recipient's addresses to be entered, as is known in the art. Hence, the invention is not limited to the specific types of computers that may

20   communicate with mail servers.

The mail servers of the invention may comprise any type of commercially available mail server, such as SendMail (a public domain open-source mail server which is well known within the art) running on a Sun Microsystems Workstation. As such, the invention is not limited to the specific hardware or software included in the mail servers.

25   Further, depending on mail relay issues, there may be additional mail servers between sender's mail server 14 and address resolution server 12 or between address resolution server 12 and receiver's mail server 16.

Address resolution server 12 may be constructed of software code running on Microsoft Windows NT on a Multi-Processor Pentium-based computer. Alternatively,

30   server 12 may be constructed from code running on a Sun Microsystems Workstation.

A variety of data bases may be employed to construct data base 22. For example, data bases that may be employed may include Microsoft SQL Server, Oracle data bases, or Sybase data bases as are known in the art.

As previously described, when the sender composes the message, a relative mail address will be employed. The relative mail address includes the domain name of address resolution server 12. The relative mail address also preferably includes a relationship identifier which is the relative portion of the address. The relationship

5 identifier identifies one or more recipients that are to receive the message. One advantage of the invention is that the relationship identifier may be employed to identify essentially any type of relationship between the sender and the desired recipients. In this way, the sender does not need to know the absolute mail address for each of the desired recipients. Instead, the user need only craft the appropriate relationship identifier. Table 1 below

10 illustrates one example of the set of relationship identifiers followed by an @ sign which in turn is followed by the domain name of an address resolution server known as "dearfamily.com."

TABLE 1

Relative Address	Interpretation
mom@dearfamily.com	My mother.
siblings@dearfamily.com	All of my brothers and sisters.
cousins@dearfamily.com	All cousins, that is descendents of any of my parents' siblings.
bob@dearfamily.com	My closest relative named Bob or Robert.
aunt.jenny@dearfamily.com	A sibling of one of my parents whose name is Jenny or Jennifer.
all@dearfamily.com	All known relatives.
smiths@dearfamily.com	All relatives whose last name is Smith.
eric.driggs@dearfamily.com	A relative whose name is Eric Driggs.
mikes@dearfamily.com	All relatives named Mike or Michael.

15

As illustrated in Table 1, the relationship identifiers may be used alone or in combination. When used in combination, the relationship identifiers are preferably separated by a period, although other separators may be used. If common nick names are

20 utilized as the relationship identifier, these may need to be resolved into a base name, such as "Bob" to "Robert" or "Jenny" to "Jennifer."

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Referring now to Fig. 2, an exemplary method for processing electronic mail which utilizes a relative mail address will be described. The process begins at step 24 when a message is available to be processed. As shown in step 26, the message is received from the sending mail server. When the message has been received, the email

5   address of the sender is retrieved from the message headers. The retrieved email address of the sender is an absolute email address of the sender. A membership database, e.g., data base 22 of Fig. 1, is consulted to locate the sender's record based on the sender's email address as shown in step 28. As shown in step 30, if the sender was found in the membership database, the method proceeds to step 32. If not, the method proceeds to

10   step 34. In the event that the sender was not found in the membership database, a message is returned to the sender indicating the error. Processing of the message then ends as shown in step 36.

If the sender was found, the relative address is resolved to one or more absolute addresses using information in the membership data base. As shown in step 38,

15   if at least one match to the relative address was successfully found, the process proceeds to step 40. If not, the process proceeds to step 42. In step 42, no destination addresses were found, and a message is returned to the sender indicating the error. Processing of the message then ends at step 44. If one or more destination addresses are found, the message is forwarded to all destination servers and the processing ends at step 46.

20   Referring now to Fig. 3, an exemplary method for resolving a relative mail address to an absolute mail address will be described. The address resolution process begins at step 48. As shown at step 50, a destination address is read from one or more in-coming addresses. For example, the in-coming addresses may include "mom@dearfamily.com, dad@dearfamily.com." In step 50, the first name is read from

25   the list. As shown in step 52, a candidate set is then defined and includes all members related to the sender. This is preferably accomplished by initializing the candidate set to include all members who are related to the sender according to the membership data base. Importantly, the relationship between the sender and the members in the candidate set is not limited to a blood relationship. Rather, the term "related" is employed to mean those

30   people who are in some way connected to the sender as defined in the database.

The process then proceeds to step 54 where the first word in the destination address is read. This word is the relationship identifier. In some cases, the relative address may include a series of words that are delimited by some kind of separator. In the case of Internet mail (SMTP), the separator is usually a period. As

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shown in step 56, the word is evaluated to determine if the relationship identifier is a key word. Key words are special words that denote some kind of relationship. Examples of key words can include, but are not limited to, mom, dad, uncle, child, friend, co-worker, room mate, supervisor, secretary, and the like. If the word is a key word, the method

5   proceeds to step 58. If not, the process proceeds to step 60.

In step 58, all candidates that match the relationship are kept. If the word is not a key word, it is assumed that the word is a name. As shown in step 60, all candidates that match the name are kept. The name may either be the first or last name, and may also be a form of a name, e.g., Bob is equivalent to Robert.

10   As shown in step 62, if there are more words in the address, the process recycles back to step 54. If not, the process proceeds to step 64. All remaining members of the candidate set are added to a new destination address list. The process then proceeds to step 66 to determine if more addresses are in the list. If so, the process loops back to step 50. If not, the process proceeds to step 68 where the resolution process is

15   complete.

Referring now to Fig. 4, one example of how a candidate set may be initialized and then utilized to determine recipients which are intended to receive the message will be described. In Fig. 4, a candidate set 70 is illustrated. For convenience of discussion, the names in candidate set 70 are related by blood. However, as previously

20   described in connection with step 52 of Fig. 3, the invention is not limited to blood relationships. In practice, the membership database, such as database 22 of Fig. 1, will include a large number of candidate sets which are similar to set 70. When one of the members of candidate set 70 sends a message, the candidate set is initialized simply by determining all members in the data base which are related to the sender.

25   The data base which includes candidate set 70 is preferably configured to define all of the relationships between the members simply by knowing one or more parents of each name and the spouse (if available) for each of the names. Information included in such a data base is set forth in Table 2 below.

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TABLE 2

Name	Absolute Address	Gender	Relationships
Art Able	AA@free.com	M	Parent: Bob Able Parent: Sandra Able Spouse: Jill Sorensen
Matthew Clark	Matt@zenith.net	M	Parent: Howard Clark Parent: Alison Jersey

			Spouse: Cecilia Jones
Cecilia Jones Clark	Celia@zenith.net	F	Parent: Orrin Jones Parent: Hazel Nelson
			Spouse: Matthew Clark
George Able	GA@home.com	M	Parent: Art Able Parent: Jill Sorensen
			Spouse: Lydia Clark
Lydia Clark Able	LCA@home.com	F	Parent: Matthew Clark Parent: Cecilia Jones
			Spouse: George Able
Ricky Able	Ricky@home.com	M	Parent: George Able Parent: Lydia Clark
Mary Able	MA@free.com	F	Parent: Art Able Parent: Jill Sorensen
John Able	John@fun.org	M	Parent: Art Able Parent: Jill Sorensen
Mary Clark	Mary@howzat.net	F	Parent: Matthew Clark Parent: Cecilia Jones

Merely to illustrate one way in which relative mail addresses involving candidate set 70 may be resolved into absolute addresses, the following examples are provided. However, it will be appreciated that the invention is not intended to be limited to these specific examples, or to the specific configuration of the data base including candidate set 70.

In one example, the sender is George Able who composes the relative address of "dad". The relative address is translated by equating "dad" with the "father" relationship and traversing that simple relationship. Once Art Able is identified, the associated absolute address of AA@free.com is extracted.

In another example, the sender is George Able who uses the relative address of "sister". The "sister" relationship is implied because Mary Able and George Able both list Art Able as their father. In a more general sense, the address is resolved by finding all children of both parents and selecting the one that is female. Hence, the message is sent to Mary Able at MA@free.com.

In yet another example, the sender is Mary Able who uses the relative mail address of "brother". As with the "sister" relationship, the system selects all male individuals that list either of Mary Able's parents (Art Able or Jill Sorensen) as a parent. This results in John Able and George Able being selected. Since "brother" is singular, and there were two matches, an error message listing the candidates may be generated. Alternatively, a dialogue message may be sent to Mary Able asking whether John Able or George Able is wanted. Mary Able may then indicate which of the brothers, if any, is desired. As a further note, although there is no direct record for Jill Sorensen, the process

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is not impaired. In this example, there are no half siblings, so all records match on both parents. However, a single parent match is considered to be sufficient. Also, in cases of adoption or step parents, there may be more than two parents listed.

In still yet another example, the sender is again Mary Able, and the

5   relative mail address is "brothers". This is the same as the previous example except that the plural form of "brothers" indicates that multiple matches are acceptable. As such, both John Able and George Able are selected and the message is sent to John@fun.org and GA@home.com.

In another example, the sender is George Able who composes a relative

10   address of "brother". In this case, both George Able and John Able are identified as male siblings of Art Able. However, George is eliminated from the candidate set because he is the sender. Hence, John is left as the only potential recipient so that the message may be sent to John@fun.org.

In still another example, the sender is John Able who sends a message to

15   the relative address of "Lydia". In this case, a name is employed rather than a key word. To resolve the name, all family members are searched to locate the one who has the specified name as one of their names. In this case, Lydia Clark Able is identified so that the message may be sent to LCA@home.com.

In another example, the sender is George Able who utilizes the relative

20   address of "Mary". This is similar to the previous example where the family database is searched to locate a matching name. However, in this case, there are two possible matches: Mary Able and Mary Clark. Mary Able is preferably chosen because a sister relationship is closer than a sister-in-law relationship.

In determining closeness of relationships, a variety of algorithms may be

25   employed. One possible algorithm is a weighting method which gives a weighting based on the number and type of links that must be traversed in order to reach the individual. A sibling relationship would have a weight of one because of the shared parent. A sibling-in-law would have a weight of two because the spouse and sibling relationships both have to be traversed. Another method is the expanding scope method where all individuals

30   within one link of the sender are selected. These individuals are then searched for a name match. If no name matches are found, all individuals within one link of the previous set (but not yet searched) are selected. The scope continues to expand until a match is found or some limit is reached.

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As another example, the sender is Ricky Able who utilizes a relative address of grandpa.able. This example uses both a key word and a name. First, the key word is used to select all candidates. In this case, grandpa selects all male parents of all parents. Then, the grandpa is selected for which one of the names is "Able". In this case,

5   Art Able is selected so that the message may be sent to AA@free.com.

In another example, the sender is George Able utilizing a relative mail address of "siblings". A key word of "siblings" is like "brothers" or "sisters" except that there is no gender constraint. Hence, all individuals with at least one parent are selected. In this case, both Mary Able and John Able are selected.

10   In still another example, the sender is George Able who utilizes the relative mail address of "brothers" and "sisters". This relative mail address also produces Mary Able and John Able as in the previous example. However, in this case, all brother and all sisters are found and the sets are then merged.

In a final example, the sender is George Able who utilizes the relative mail

15   address of "parents.of.wife". The "of" operator causes multiple relationships to be traversed in right to left order. Hence, the wife of George is first located, and then her parents are selected. As a result, both Matthew Clark and Cecilia Jones Clark are selected.

As previously mentioned, the above examples are provided merely to

20   illustrate how one can resolve relative names into absolute names. However, it will be appreciated that a variety of algorithms may be employed. Further, within family relationships, only a small subset of key words have been illustrated. Examples of other key words that may be included are "aunt," "uncle," "cousin," "niece," "nephew," "in-law" (modifier to parent, brother, or sister), "wife," "husband," "spouse," and the like.

25   Further, within other domains, other sets of key words may be used with corresponding algorithms. For example, a company may have "supervisor," "manager," "underlings," "president," "assistant," and the like.

The methods of the invention may be provided with a variety of enhancements or alterations depending on particular needs. As previously described,

30   names and/or key words can often include plurals. Preferably, the invention will reduce the names and/or key words to the singular form before matching. However, the fact that a plural was used may be flagged. Once the address resolution is complete, if there is more than one match and a plural was not used, then an error condition may be returned to the user instead of proceeding to send a message. For example, this would prevent

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sending the message to three "Bobs" when just the brother "Bob" was intended. As previously mentioned, a dialogue may be established with the sender to determine the correct recipient or recipients.

As an alternative, if a singular form was used and multiple matches were provided, the matches may be ranked according to closeness of the relationship. A message may then be sent to the sender indicating the closest match.

In some cases, a matching of words may be made sensitive to the position in the series of words. For example, if multiple names were used, the first might match first names while the last may match last names. A different matching algorithm may be employed where all criteria are tested at once rather than the interactive process as previously described.

In another alternative, a special token in the address, such as a question mark, may be used to indicate that the server should return a list of all matching addresses to the sender rather than forwarding the message on. Use of such a token may be useful for testing addresses before sending a message.

Another feature that may be utilized with the invention is a directory service feature. LDAP (lightweight directory access protocol) is growing in popularity as a protocol for accessing directory services. This protocol (as well as other similar protocols) may be used when a message is being composed to access a directory server. Such an LDAP interface on the resolution server may be provided to allow a user to look at names using relative addresses before the message is sent. As one example, using the LDAP protocol, a user is able to enter a relative mail address and then view the resolved absolute mail addresses and the associated recipient name prior to sending the message. Such a feature allows the sender to visualize the absolute mail addresses and the recipient prior to sending the message to ensure that the message is sent to the proper recipient.

The invention may also utilize a special indicator in the relative address, such as an exclamation point, to indicate that the server should expand the search for a name match beyond the members that are specifically related to the user in some way. A search may even be expanded to include known public directories using the LDAP protocol. In such a case, the relative aspect of the address would preferably be limited to ranking matches based on some kind of "nearness" algorithm.

The invention may also be used with wireless devices as well as with the public telephone switching network. Merely by way of example, the invention may be used with mobile phones and personal digital assistants having embedded microbrowsers.

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The address resolution techniques previously described may be used with such devices to transfer messages or to establish live communication links. For instance, relative address may be used with short message service (SMS), microbrowser directory access, interactive voice response (IVR), conference calling, voice messaging, and general message delivery.

To enter relative addresses or messages into the devices of the invention, a variety of techniques may be used. Although most phones and wireless devices lack a full alphabetic keyboard, there are a number of ways of entering text using fewer keys. For example, a multipress method may be used where the letters printed on most telephone keys are used to enter information. For example, the number 2 includes "a," "b," and "c." To enter the first letter the key is pressed once, for the second, twice, etc. To enter the number the key is pressed four times.

The predictive text method is similar to multipress. However, it reduces the number of keys per letter to one. As keys are pressed, it anticipates the correct word out of all of the possible combinations of letters matching the keys that have been pressed. This is possible because there are a limited combination of letters corresponding to the numbers on a telephone pad that are meaningful and pronounceable. One such implementation is called "T9", available from Tegic systems and licensed to most mobile phone manufacturers. Such a systems is also described in U.S. Patent Nos. 5,818,437 and 5,953,541, the complete disclosures of which are herein incorporated by reference. In this system, the number keys are typed corresponding to the desired letters. By the time a word is completed it is usually correct. If not, pressing the 0 key allows one to cycle through the other possibilities.

The limited list method is similar to predictive text. However, in this case the possibilities are limited by the current context. The user types the series of numbers corresponding to the letters of the desired text. The system then determines whether the numbers unambiguously identify one of the possible words.

Referring now to Fig. 5, a communication system 80 is shown which utilizes a short message service. System 80 includes an initiator mobile phone 82 and a recipient mobile phone 84, it being appreciated that multiple recipient phones may be used. Messages are transferred from phone 82 to phone 84 using a Short Message Service (SMS). The SMS is presently popular on mobile phones in certain European countries. In essence, SMS allows an individual to enter a short textual message into

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phone 82 and send it to one or more other phones 84. Recipient phones 84 are addressed using their phone number.

Relative addressing as previously described is applied to the Short Message Service by allowing individuals to use relative addresses as the destination of

5   messages. More specifically, a relative delivery address is input into phone 82. For example, the relative delivery address may be any kind of key work, such as "mom". Conveniently, the relative addresses may be offered through a partnership with a wireless service provider, and the relative address may be distinguished from an absolute phone number by being textual instead of numeric. Using methods similar to relative e-mail

10   addressing as previously described, the relative addresses are resolved to absolute phone numbers by a message relay server 86 and then forwarded on to the recipient phone 84.

Relative addressing may also be used to establish a communication link between two or more phones for live communication. For example, the majority of personal wireless data devices are mobile phones. Many of these include a microbrowser

15   which is similar to a web browser but limited to a small display and with limited features. The microbrowsers on many of these devices allow links to telephone numbers. Thus, such devices may be used to access a directory service using such a link to retrieve a telephone number and then place a voice call. The directory service may be configured to resolve relative addresses into phone numbers to permit connections to be established.

20   One such communication system 88 is shown in Fig. 6. Communication system 88 has an initiator mobile phone 90 and a recipient mobile phone 92. Phone 90 includes a display screen and a microbrowser which is similar to a traditional web browser but limited to a small display and with limited features. Conveniently, the microbrowser may allow links to telephone numbers. Thus, phone 90 may access a

25   directory service server computer 94 using such a link to retrieve a telephone number and then place a voice call to phone 92.

Relative addressing may be used to place the call to phone 92 (or to multiple phones) using the microbrowser by first having the user to identify him/herself. In some cases, mobile phone 92 may be configured to identify itself, and server 94 may

30   be configured to assume that the user is the registered owner of the phone. The user then specifies the relative address of someone he/she would like to call, i.e. by textual entry or voice entry. For example, the relative address may simply be the name of an individual, e.g., Bob, or a relation, e.g. co-worker. The relative address is sent to server 94 where the directory service resolves the relative address to an absolute individual and their phone

number using any of the techniques previously described. Server 94 returns the telephone number to phone 90 which connects directly to the destination number of phone 92. This may be accomplished by configuring phone 90 to automatically dial the number, or to display the number and permit the user to dial. Conveniently, the name and phone

5   number corresponding to phone 92 may be displayed on the display screen using the web browser.

Shown in Fig. 7 is an alternative communication system 96 which uses relative addresses to permit live communication between an initiator phone 98 and a recipient phone 100. This concept is similar to the system of Fig. 6 as just described

10   except that an interactive voice response (IVR) system 120 is used. With IVR, no special features are required on the phone and it is equally applicable to wired and wireless phones.

To place a phone call using relative addressing, the user dials an access number which is answered by an IVR voice prompt generated by system 120. The user

15   identifies him/herself either using voice (e.g. speaking his/her name) or by typing a personal identification number on the keypad of phone 98. Conveniently, IVR system 120 may be used to authenticate individuals using voiceprint analysis. Alternatively, system 120 might identify the user by using a caller ID and a reverse directory lookup.

The user speaks the keyword or name of the individual he/she wants to

20   call, i.e. the relative address. Alternatively, the keyword or name may be entered into the phone keypad using multipress or limited list techniques as previously described. IVR system 120 accesses a directory which resolves the target relative address to an absolute address. Optionally, system 120 may confirm the matching individual with the user. IVR system 120 includes a directory server which commands a public switched telephone

25   network to transfer the call to the target individual's phone number, i.e. to phone 100.

As shown in Fig. 8, system 96 may be used to place conference calls. More specifically, multiple absolute addresses may be specified, either by using multiple relative addresses or using a relative address that resolves to multiple absolute addresses. A conference call is then established between the caller and all addressees in a manner

30   similar to that just described.

For example, the specified address may be "brothers and sisters". System 120 may be used to resolve to the phone numbers of all brothers and all sisters of the caller. A command may then be given to connect phones 100 to phone 98.

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The relative addressing techniques of the invention may also be used with Internet or other network services that are capable of delivering a message using a variety of communication devices in a variety of media types. For example, the service may be configured deliver a text message to mix of phones (through voice synthesis), pagers,

5   email addresses, or fax machines. One example of such a service is MessageBlaster (http://www.messageblaster.com).

The invention may utilize a message transfer server having a general purpose directory that lists several addresses of different types for each individual (e.g. phone number, fax number, e-mail, pager, or the like). In any of the messaging-style

10   techniques previously described, e.g., use of e-mail, Short Message Service, voice messaging, the message transfer server may be configured to look up the target individual in the directory and then deliver the message to the address using the same kind of messaging system.

A general message delivery system may also use a mix of message types,

15   message urgency, available recipient addresses (e.g. phone number but no fax), and recipient preferences to determine what kind of system should be used to deliver the message. The message may then be translated into an appropriate form for the target address. For example, voice synthesis could be used to translate from text to voice messaging.

20   The invention has now been described in detail for purposes of clarity and understanding. However, it will be appreciated that certain changes and modifications may be practiced within the scope of the claimed invention.

WHAT IS CLAIMED IS:

1. A method for sending a message, comprising:

composing a relative delivery address which is associated with at least one recipient;

associating a message with the relative delivery address;

resolving the relative delivery address to an absolute delivery address for each recipient; and

sending the message to each absolute delivery address.

2. A method as in claim 1, wherein the address composing step comprises entering the relative delivery address into a mobile phone, and wherein the message associating step comprises entering a textual message into the mobile phone.

3. A method as in claim 2, further comprising wirelessly transmitting the relative delivery address and the message from the mobile phone to a message transfer server, wherein the resolving step comprising determining a phone number for a phone of the recipient using the message transfer server, and wherein the message sending step comprises sending the message from the message transfer server to the recipient phone.

4. A method as in claim 1, wherein the message is in the form of a first media type, and further comprising transforming the message to a second media type prior to sending the message to the absolute delivery address.

5. A method as in claim 1, wherein the recipient has multiple absolute delivery addresses that are associated with different communication devices, and further comprising resolving the relative delivery address to at least some of the multiple absolute delivery addresses.

6. A method as in claim 1, further comprising displaying the name of each recipient and the associated absolute delivery address prior to sending the message.

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7. A method as in claim 1, wherein the resolving step comprises providing a set of names, with each name being associated with at least one common relative; determining the name of a sender of the message; and identifying one or more recipients based at least in part on the common relative and information in the relative delivery address.

8. A method for resolving a relative delivery address to an absolute delivery address, the method comprising:

providing a set of names, with each name having an associated absolute delivery address and at least one relationship identifier indicating a relation with one or more of the names in the set;

receiving a relative delivery address having a sender's name and a relationship identifier;

determining a candidate name set from the set of names based at least in part on the sender's name;

comparing the relative delivery address relationship identifier with each name in the candidate name set to determine one or more recipients; and

identifying the absolute delivery address for each recipient.

9. A method as in claim 8, wherein the candidate set is determined based on a common relationship between the sender and the set of names.

10. A method for sending a message, comprising:

providing a set of names, with each name being associated with at least one common relative in the set of names;

receiving a message from a sender phone, the message having a relative delivery address which is associated with at least one recipient phone number and includes a relationship identifier;

identifying one or more recipients based at least in part on the relationship identifier and the common relative; and

sending the message to the recipient phone.

11. A method as in claim 10, wherein the common relative is a blood relative.

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12. A system to facilitate the sending of a message between a sender and a recipient using a relative delivery address, the system comprising:

a resolution server which is adapted to receive from a sender communication device a transmitted message having a relative recipient delivery address and to forward the message to a recipient communication device, wherein the relative recipient delivery address includes a relationship between the sender and the recipient;

code to resolve the relative recipient delivery address associated with the message to a recipient absolute delivery address; and

code to forward the message to the recipient's communication device based on the recipient absolute delivery address.

13. A system as in claim 12, wherein the sender communication device and the recipient communication devices comprise mobile phones, and further comprising code to resolve the relative recipient delivery address to a phone number of the recipient phone.

14. A system as in claim 12, wherein the message is in the form of a first media type, and further comprising code to transform the message to a second media type prior to sending the message to the absolute delivery address.

15. A system as in claim 13, further comprising code to extract a telephone number of the sender from the message received by the resolution server, and code to resolve the relative recipient delivery address associated with the message to the recipient's phone number based on the sender's phone number and the relationship recited in the relative recipient delivery.

16. A system as in claim 12, further comprising a database associated with the mail resolution server, the database having fields for storing names, associated absolute delivery addresses and relationships between the names.

17. A computer readable medium containing a program for reading a delivery address comprising the steps of:

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reading a relative delivery address which is associated with at least one

recipient;

receiving a message which is associated with the relative delivery address;

resolving the relative delivery address to an absolute delivery address for

each recipient; and

sending the message to each absolute delivery address.

18. A computer readable medium as in claim 17, wherein the absolute delivery address comprises a mobile phone number.

19. A method for sending a message, comprising:

at a communication device of an initiating individual, composing a relative delivery address which is associated with at least one receiving individual;

resolving the relative delivery address to an absolute delivery address for a communication device of the receiving individual; and

establishing a connection for real time communication between the initiating individual and the receiving individual using the communication devices.

20. A method as in claim 19, wherein the communication devices comprise phones, and wherein the communication comprises verbal messages between the individuals.

21. A method as in claim 20, wherein the phones comprise mobile phones, and wherein the connection comprises a wireless connection.

22. A method as in claim 20, wherein the connection is established over a public switched telephone network.

23. A method as in claim 19, wherein the connection is established between the initiating individual and only one receiving individual.

24. A method as in claim 19, further comprising establishing connections between the initiating individual and multiple receiving individuals.

25. A method as in claim 19, wherein the address composing step comprises entering the relative delivery address into a mobile phone of the initiating individual.

26. A method as in claim 25, wherein the mobile phone includes a web browser, and further comprising producing an entry page using the web browser to facilitate entry of the relative delivery address.

27. A method as in claim 25, further comprising wirelessly transmitting the relative delivery address from the mobile phone to a directory server, wherein the resolving step comprises determining a phone number for a phone of the recipient using the delivery server, and wherein the connection establishing step comprises sending the recipient phone number to the initiator phone, and dialing the recipient phone number using the initiator phone.

28. A method as in claim 19, wherein the communication devices comprise phones, wherein the address composing step comprises entering the relative delivery address into the phone of the initiating individual.

29. A method as in claim 28, further comprising transmitting the relative delivery address from the phone of the initiating individual to an interactive voice response system having a directory server using a public switched telephone network, wherein the resolving step comprises determining a phone number for the phone of the recipient using the delivery server, and wherein the connection establishing step comprises sending a command from the delivery server to the public switched telephone network to establish the connection between the recipient phone number to the initiator phone.

30. A method as in claim 19, wherein the communication is in the form of a first media type, and further comprising transforming the communication to a second media type.

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31. A method for establishing a communication link between a phone of an initiator and a phone of at least one recipient, comprising:

providing a set of names, with each name being associated with at least one common relative in the set of names;

receiving a relative delivery address from an initiator phone which is associated with at least one recipient phone number and includes a relationship identifier;

identifying one or more recipient phone numbers based at least in part on the relationship identifier and the common relative; and

using the recipient phone number to establish a communication link between the initiator phone and the recipient phone.

32. A method as in claim 31, further comprising sending the recipient phone number to the initiator phone to permit the initiator phone to establish the connection.

33. A method as in claim 31, further comprising sending the recipient phone number to a public switched telephone network to establish the connection.

34. A method for establishing a communication link between a phone of an initiator and a phone of at least one recipient, comprising:

at a directory server, receiving a relative delivery address from an initiator phone which is associated with at least one recipient phone number;

identifying one or more recipient phone numbers using the directory server; and

using the recipient phone number to establish a communication link between the initiator phone and the recipient phone.

35. A method as in claim 34, further comprising sending the recipient phone number to the initiator phone to permit the initiator phone to establish the connection.

36. A method as in claim 34, further comprising sending the recipient phone number to a public switched telephone network to establish the connection.

37. A system to facilitate the communication between a sender and a recipient using a relative delivery address, the system comprising:

a directory server which is adapted to receive from a sender communication device a relative recipient delivery address that is associated with a recipient communication device, wherein the relative recipient delivery address includes a relationship between the sender and the recipient;

code to resolve the relative recipient delivery address to a recipient absolute delivery address; and

code to send the absolute delivery address to a communication mechanism to established a communication link between the sender communication device and the recipient communication device.

38. A system as in claim 37, wherein the initiator communication device and the recipient communication device each comprise phones, and further comprising code to resolve the relative recipient delivery address to a phone number of the recipient phone.

39. A system as in claim 38, wherein the communication mechanism comprises the initiator phone, and further comprising code to sent the recipient phone number to the initiator phone to establish a wireless connection between the initiator phone and the recipient phone.

40. A system as in claim 38, wherein the communication mechanism comprises a public switched telephone network, and further comprising code to send the recipient phone number to the public switched telephone network.

41. A system as in claim 38, wherein the initiator phone includes a web browser, and wherein the directory server is configured to send and receive web documents to and from the to and from the initiator phone.

42. A communication device comprising:

a mobile phone having an entry device, a display screen and a web browser, wherein the mobile phone is configured to send an entered relative delivery

address to a server and to establish a connection with recipient phone upon receipt of a recipient phone number from the server.

43. A method for sending a message, comprising:

composing a relative mail address which is associated with at least one recipient;

associating a message with the relative mail address;

resolving the relative mail address to an absolute mail address for each recipient; and

sending the message to each absolute mail address.

44. A method as in claim 43, wherein the resolving step comprises providing a set of names, with each name being associated with at least one common relative; determining the name of a sender of the message; and identifying one or more recipients based at least in part on the common relative and information in the relative mail address.

45. A method as in claim 44, wherein the common relative is a blood relative, and wherein the relative mail address includes a relationship identifier which includes an identification of the recipient's gender.

46. A method as in claim 43, wherein the relative mail address is an e-mail address comprising a relationship identifier and a mail resolution server identifier, and further comprising sending the message to a mail resolution server identified by the mail resolution server identifier.

47. A method as in claim 46, wherein the resolving step comprises determining the name of a sender of the message, identifying a candidate set of names that are associated with the sender, and identifying members of the candidate set which have a relationship with the sender that is the same as the relationship identified by the relationship identifier.

48. A method as in claim 47, wherein the relationship identifier is a keyword or a name.

49. A method as in claim 47, further comprising identifying the absolute mail address that is associated with each identified member of the candidate set.

50. A method for resolving a relative mail address to an absolute mail address, the method comprising:

providing a set of names, with each name having an associated absolute mail address and at least one relationship identifier indicating a relation with one or more of the names in the set;

receiving a relative mail address having a sender's name and a relationship identifier;

identifying one or more recipients based at least in part on the sender's name and the relationship identifier; and

identifying the absolute mail address for each identified recipient.

51. A method as in claim 50, wherein the identifying the recipient step comprises inferring one or more recipients based on related relationships in the set of names.

52. A method as in claim 50, wherein the step of identifying one or more recipients comprises:

determining a candidate name set from the set of names based on the sender's name;

comparing the relative mail address relationship identifier with the relationship identifiers of each name in the candidate name set; and

identifying the absolute mail address for the name or names in the candidate set which has the same relationship identifier as the relative mail address relationship identifier.

53. A method for resolving a relative mail address to an absolute mail address, the method comprising:

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providing a set of names, with each name having an associated absolute mail address and at least one relationship identifier indicating a relation with one or more of the names in the set;

receiving a relative mail address having a sender's name and a relationship identifier;

determining a candidate name set from the set of names based at least in part on the sender's name;

comparing the relative mail address relationship identifier with each name in the candidate name set to determine one or more recipients; and

identifying the absolute mail address for each recipient.

54. A method as in claim 53, wherein the candidate set is determined based on a common relationship between the sender and the set of names.

55. A method for sending a mail message, comprising:

providing a set of names, with each name being associated with at least one common relative in the set of names;

receiving a mail message from a sender, the mail message having a relative mail address which is associated with at least one recipient and includes a relationship identifier;

identifying one or more recipients based at least in part on the relationship identifier and the common relative; and

sending the mail message to the recipient.

56. A method as in claim 55, wherein the common relative is a blood relative.

57. A system to facilitate the sending of a message between a sender and a recipient using a relative mail address, the system comprising:

a mail resolution server which is adapted to receive an electronic message having a relative recipient mail address from a sender mail server and to forward the message to a recipient mail server, wherein the relative recipient mail address includes a relationship between the sender and the recipient;

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code to resolve the relative recipient mail address associated with the message to a recipient absolute mail address; and

code to forward the message to the recipient's mail server based on the recipient absolute mail address.

58. A system as in claim 57, further comprising code to extract an absolute mail address of the sender from the message received by the mail resolution server, and code to resolve the relative recipient mail address associated with the message to the recipient's absolute mail address based on the sender's absolute mail address and the relationship recited in the relative recipient mail address.

59. A system as in claim 57, further comprising a database associated with the mail resolution server, the database having fields for storing names, associated absolute mail addresses and relationships between the names.

60. An apparatus to facilitate the sending of a message between a sender and a recipient using a relative mail address, the apparatus comprising:

a mail resolution server which is adapted to receive an electronic message having a relative recipient mail address from a sender mail server and to forward the message to a recipient mail server, wherein the relative recipient mail address includes a relationship between the sender and the recipient;

code to extract an absolute mail address of the sender from the message received by the mail resolution server;

code to resolve the relative recipient mail address associated with the message to a recipient absolute mail address based on the sender's absolute mail address and the relationship recited in the relative recipient mail address; and

code to forward the message to the recipient's mail server based on the recipient absolute mail address.

61. A computer readable medium containing a program for reading a mail address comprising the steps of:

reading a relative mail address which is associated with at least one recipient;

receiving a message which is associated with the relative mail address;

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resolving the relative mail address to an absolute mail address for each recipient; and

sending the message to each absolute mail address.

62. A computer data signal embodied in a carrier wave, comprising:

a mail address having a relationship identifier and a mail resolution server identifier; and

a message associated with the mail address.

63. A computer data signal as in claim 62, further comprising an absolute mail address of a sender of the message.

64. A method as in claim 43, further comprising displaying the name of each recipient and the associated absolute mail address prior to sending the message.
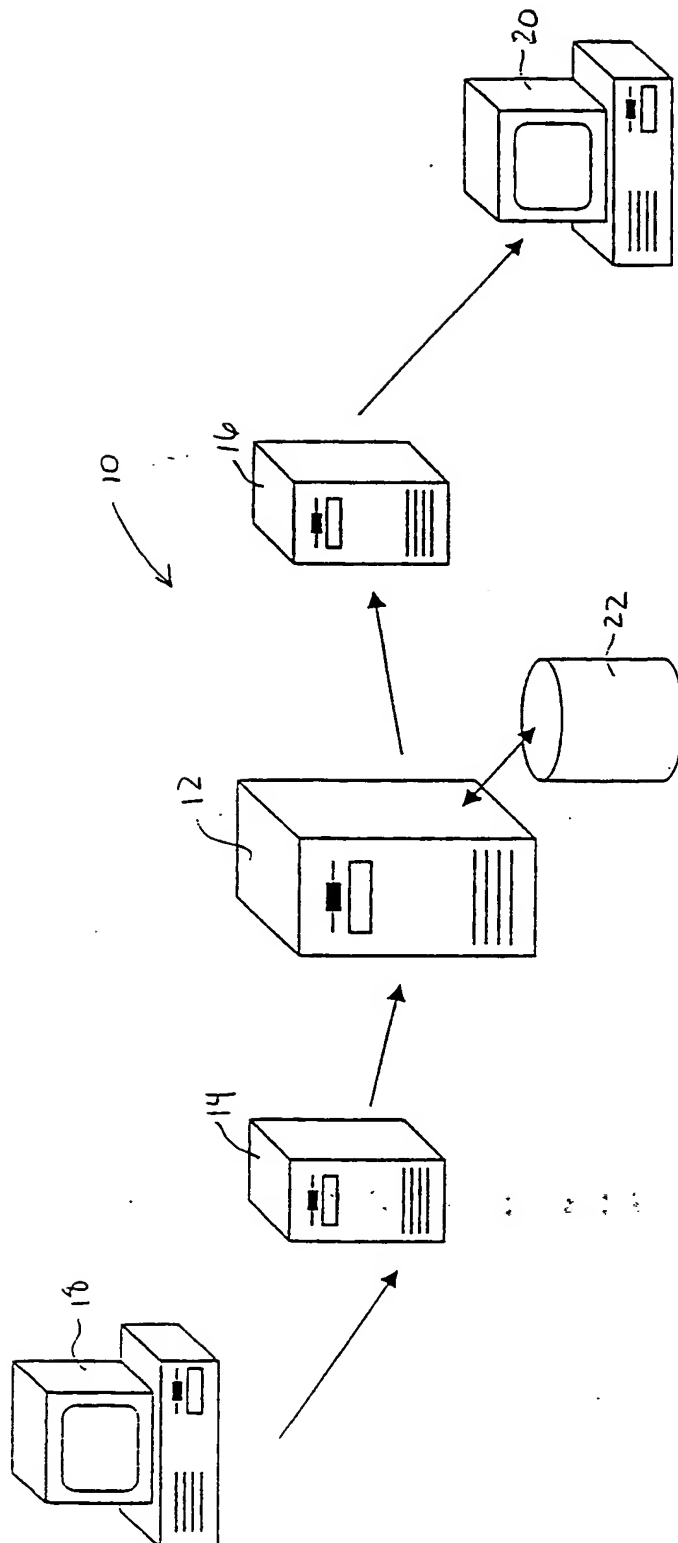
65. A method as in claim 50, further comprising displaying the names of the recipients and their associated absolute mail addresses.

66. A method as in claim 55, further comprising displaying the name of each recipient and the associated absolute mail address prior to sending the message.

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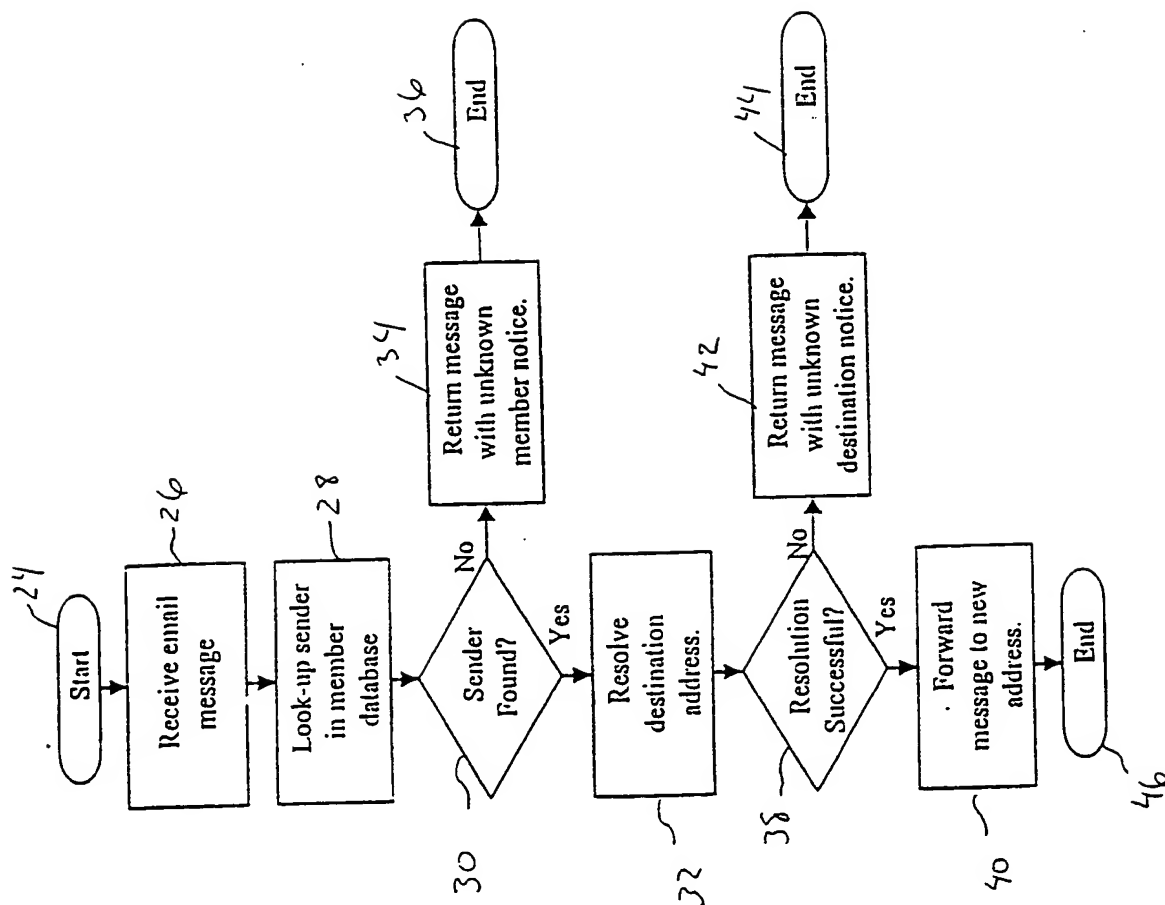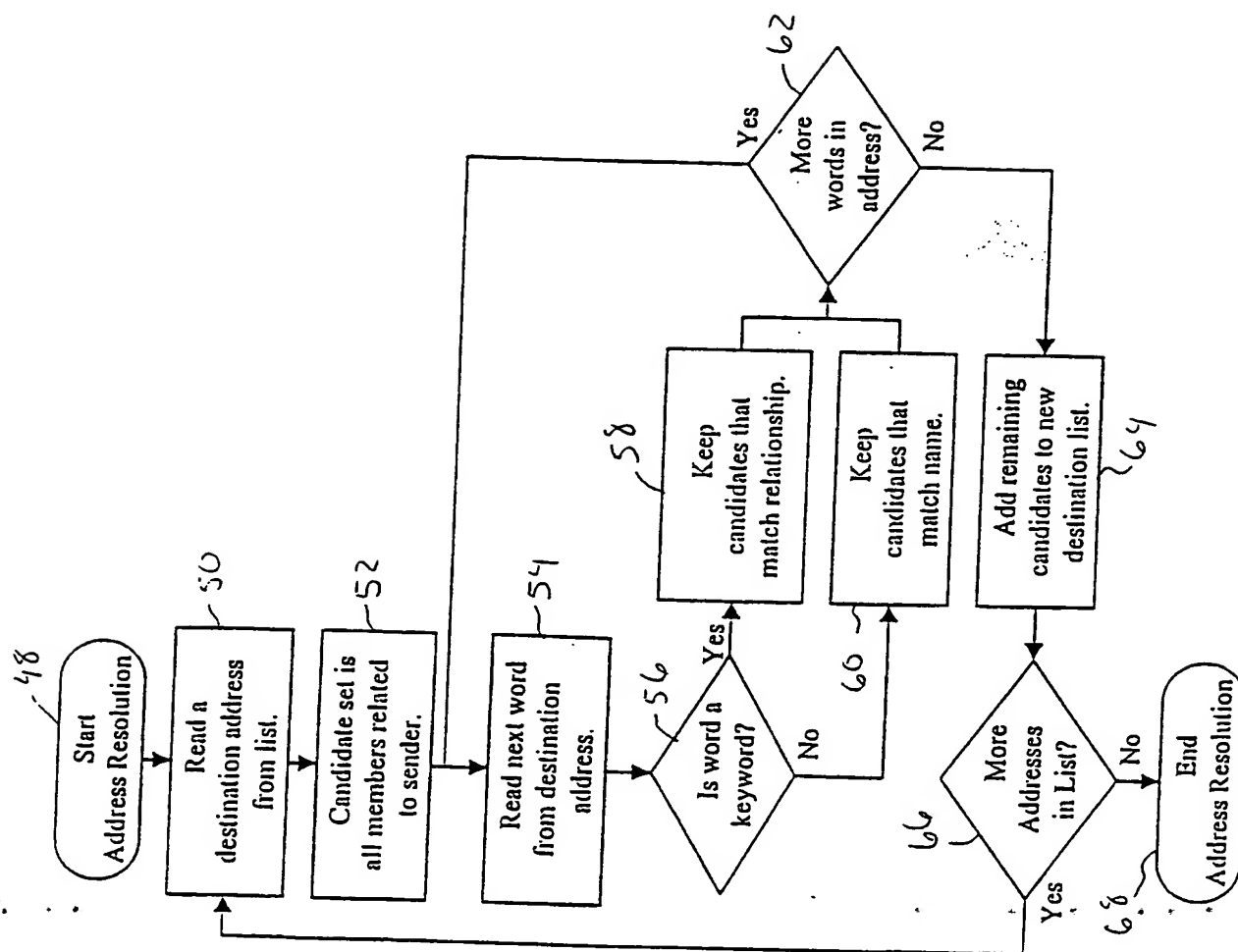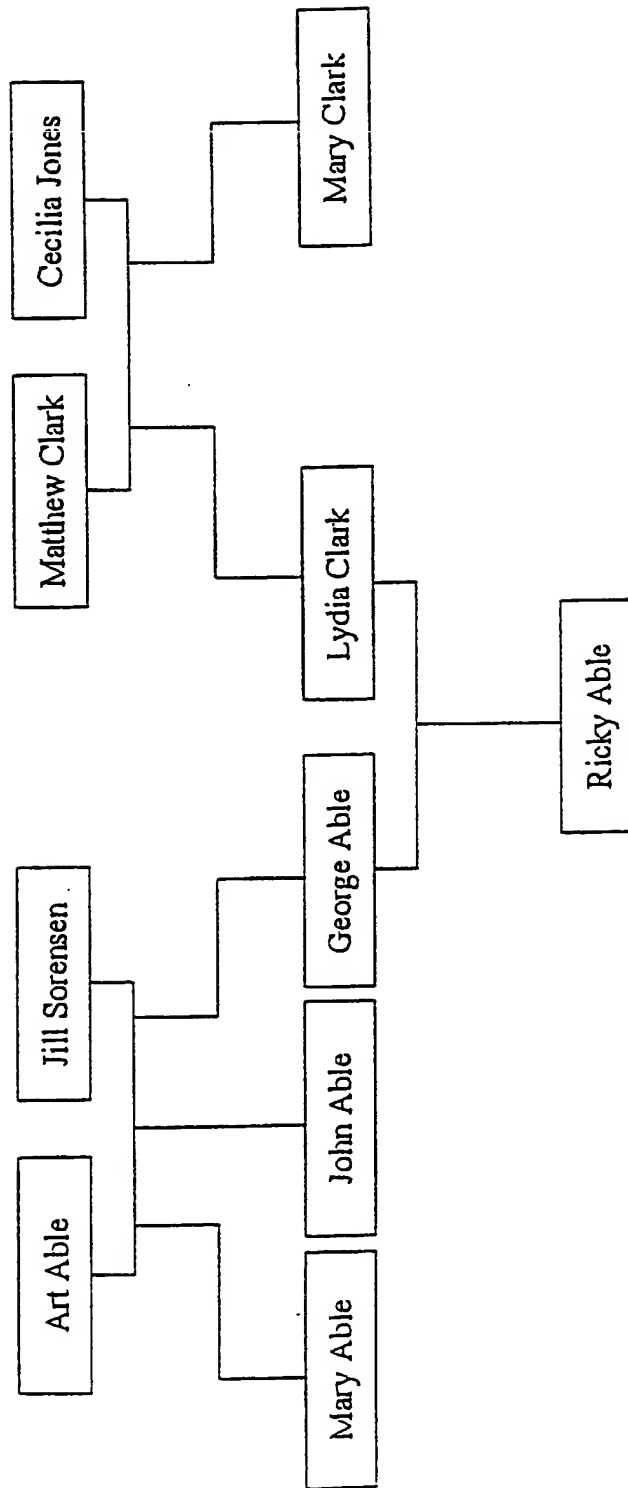
FIG.1

FIG. 2

FIG. 3

Start Address Resolution 48

Read a destination address from list. 50

Candidate set is all members related to sender. 52

Read next word from destination address. 54

Is word a keyword? 56

Yes → Keep candidates that match relationship. 58

No → Keep candidates that match name. 60

More words in address? 62

Yes → (back to Read next word)

No → Add remaining candidates to new destination list. 64

More Addresses in List? 66

Yes → (back to Read a destination address)

No → End Address Resolution 68

FIG.4

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR RELATIVE MESSAGE ADDRESSING

(57) Abstract: The invention provides exemplary systems and methods for sending mail messages. In one method, a relative delivery address is composed which is associated with at least one recipient. A message is associated with the relative delivery address. The relative delivery address is resolved to an absolute delivery address (32).

WO 00/77593 A3

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 15/16; H04M 1/56, 11/00
US CL :709/206, 227, 228
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/204, 205, 206, 227, 228; 379/67.1, 88.01, 88.04, 88.17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST patent text search
Terms: message address resolving, group name/alias, phone/distribution list broadcast

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	US 6,212,552 B1 (BILIRIS et al.) 03 APRIL 2001 Abstract, Column 2, Lines 15-49, Column 3, Lines 15-67, Column 4, Line 51 through Column 7, Line 60	1, 4-6, 8-12, 16-18, 31-40, 43-66
Y, P		2-3, 7, 13-15, 19-30, 41-42
Y	US 5,742,905 A (PEPE et al.) 21 APRIL 1998 Abstract, Column 3, Lines 27-42, Column 4, Lines 56-67, Column 5, Line 27 through Column 6, Line 51, Column 7, Lines 22-59, Column 23, Lines 12-62, Column 29, Line 26 through Column 30, Line 27	2-3, 7, 13-15, 19-30, 41-42

[X] Further documents are listed in the continuation of Box C.   [ ] See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier document published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 JANUARY 2002	**13 FEB 2002**

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	MARC THOMPSON
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Form PCT/ISA/210 (second sheet) (July 1998)*

INTERNATIONAL SEARCH REPORT

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,621,727 A (VAUDREUIL) 15 APRIL 1997 Entire document	1-66
A	US 5,923,848 A (GOODHAND et al.) 13 JULY 1999 Entire document	1-66
A,E	US 6,185,288 B1 (WONG) 06 FEBRUARY 2001 Entire document	1-66

INTERNATIONAL SEARCH REPORT

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

   Please See Extra Sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest
   ☐ The additional search fees were accompanied by the applicant's protest.
   ☒ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1998)

INTERNATIONAL SEARCH REPORT

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING
This ISA found multiple inventions as follows

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1 In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claim(s) 1-30, 37-41, and 43-66, is drawn to facilitation of sending a message by resolving a relative address (i.e., alias) to an absolute (i.e., unique) address.

Group II, claim(s) 31-36 and 42, is drawn to establishing a communication link (connection establishment) between two network devices (i.e., initiator and recipient).

The inventions listed as Groups I and II do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The invention groups are drawn towards divergent, distinctly different inventions. Functionality for facilitating the sending of a message by resolving a relative delivery address to an absolute delivery address does not necessarily involve the establishing of a communication link between network elements, e.g., an initiator and a recipient. Likewise, establishment of a connection between netowrk elements do not necessarily involve the resolution of alias address(es). Thus, the two groups do not share a common inventive concept.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

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[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR RELATIVE MESSAGE ADDRESSING
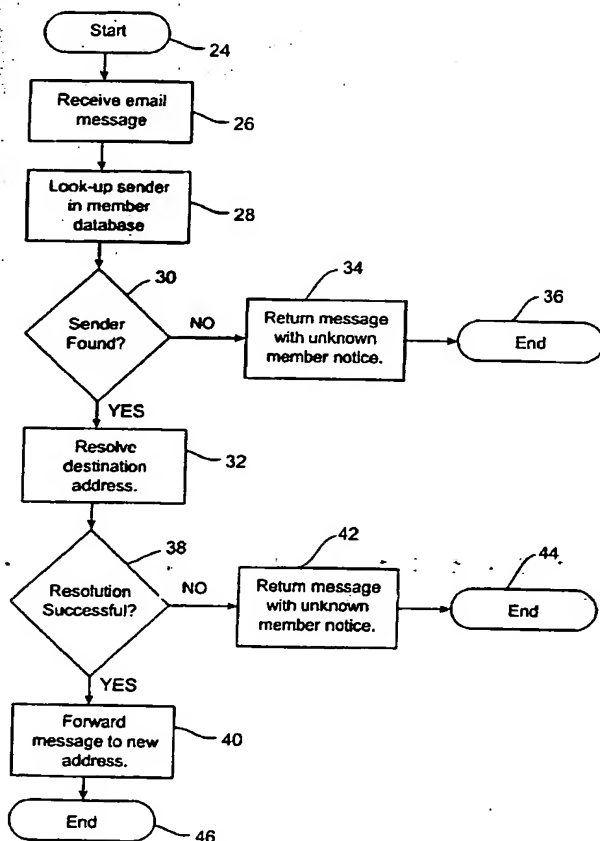
(57) Abstract: The invention provides exemplary systems and methods for sending mail messages. In one method, a relative delivery address is composed which is associated with at least one recipient. A message is associated with the relative delivery address. The relative delivery address is resolved to an absolute delivery address (32).

WO 00/077593 A3

(84) **Designated States** *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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SYSTEMS AND METHODS FOR RELATIVE MESSAGE ADDRESSING

CROSS REFERENCE TO RELATED APPLICATIONS

5   This application is a continuation in part application of U.S. Patent Application Serial No. 09/329,669, filed June 10, 2000, the complete disclosure of which is herein incorporated by reference.

BACKGROUND OF THE INVENTION

10   This invention relates generally to the field of mail or message delivery, and in particular to the delivery of electronic mail, commonly referred to as e-mail, as well as other types of messages. More specifically, in one embodiment the invention relates to the delivery of e-mail or other types of messages which utilize a relative mail or other relative delivery address.

15   Throughout the world, Internet e-mail is rapidly becoming a popular way to send messages. When a sender desires to send a message to a recipient, the sender must enter the e-mail address of the recipient into the sender's computer. Internet e-mail address are composed of the user's account ID followed by an at-sign "@". The name of their assigned mail server follows the at-sign which is then followed by a top level

20   domain, such as .com, .org, and the like. Presently, the name of the assigned mail server is referred to as the domain name. For personal accounts, the domain name is generally the name of their Internet Service Provider. For corporate employees, the domain name is usually related to the company name. Typically, the domain name bears no relationship to the individual's name nor his or her physical location or residence. For example, Tom

25   Smith, an employee of company XYZ, Inc. may have an e-mail address of: TSmith@XYZ.com. In this example, TSmith is the account ID for Tom Smith and XYZ is the domain name of XYZ, Inc.

E-mail addresses of the types described above can be generally referred to as absolute e-mail addresses. This designation is given because the destination address specifies an exact destination regardless of the sender's address. Absolute mail addresses

30   are also used with traditional mail. For example, to mail a letter to Tom Smith at XYZ, Inc., the letter would be addressed with the name of Tom Smith and the mailing address

of XYZ, Inc. If both these pieces of information are missing, it will be difficult, if not impossible, to correctly deliver the piece of mail.

One problem associated with the use of absolute e-mail addresses is that they are prone to change, thus making it difficult for senders to maintain an accurate list

5   of recipient addresses. For example, many families now find it convenient to communicate by e-mail. However, as family members switch internet services providers, e.g., to obtain better rates or service, they change employment, or their e-mail address changes for other reasons, it becomes difficult to maintain an accurate list of addresses.

In an attempt to address this problem, a variety of electronic address book

10   programs have been proposed. For example, many e-mail client programs, such as Eudora, Netscape, or Microsoft Outlook include an address book feature. However, these address books are complicated and it remains the responsibility of each individual to keep his or her address book current.

Problems relating to address changes are not limited to e-mail systems.

15   For example, individuals telephone numbers often change. Further, with the advent of a host of new communication devices, such as mobile phones, digital assistants, facsimiles, and the like, the chances of changing one or more phone numbers over time is likely.

Hence, it would be desirable to provide a way to facilitate the sending of mail which would overcome or greatly reduce the problems associated with previous

20   attempts. In particular, it would be desirable to provide systems and methods for delivering mail where an absolute address for the recipient was not needed. In this way, mail could be delivered to one or more recipients without knowing each absolute mail address, thereby eliminating the need to keep detailed and up-to-date records of the absolute mail address for each recipient. Further, it would be desirable to apply such

25   techniques to other communication devices when sending messages, or when communicating live using such devices.

SUMMARY OF THE INVENTION

The invention provides exemplary systems and methods for sending mail

30   messages. According to one exemplary method, a relative delivery address, such as a relative mail address, that is associated with at least one recipient is composed. A message is associated with the relative delivery address, and the relative delivery address is resolved to an absolute delivery address for each recipient. Such an absolute delivery address may comprise, for example, a recipient's e-mail address or phone number. Once

the absolute delivery address has been identified, the message is sent to each absolute delivery address. In this way, the message may be sent without requiring the sender to compose an absolute delivery address for each recipient.

In one particular aspect, a set of names is provided, with each name having an associated absolute mail address or phone number and at least one relationship identifier indicating a relation with one or more of the names in the set. The relative delivery address composed by the sender preferably includes a relationship identifier so that the relative delivery address may be resolved to the absolute mail address or phone number by identifying one or more recipients based at least in part on the sender's name and the relationship identifier.

In one particular aspect, each name in the set of names is associated with at least one common relative. In this way, the relative delivery address may be resolved to an absolute mail address or phone number by identifying one or more recipients based at least in part on the common relative and the relationship identifier in the relative delivery address. Conveniently, the common relative may be a blood relative, such as a parent. Further, the relationship identifier may include an identification of the recipient's gender. In this way, the recipient or recipients may be inferred by utilizing the common relative. For example, a sender may wish to send a message to a relative delivery address which uses "sister" as the relationship identifier. The sender's sisters may then be identified by first identifying all siblings which have the same parent as the sender. The females in the potential recipient group are then identified as the recipients which are to receive the message.

In still another aspect, the relative mail address is an e-mail address which includes the relationship identifier as well as a mail resolution server identifier. The message is then sent to a mail resolution server which is identified by the mail resolution server identifier. The mail resolution server may then be employed to resolve the relative mail address into one or more absolute mail addresses.

In still yet another aspect, the relative delivery address may be resolved into an absolute mail address by identifying a candidate set of names that are associated with the sender. Members of the candidate set are identified which have a relationship with the sender that is the same as the relationship identified by the relationship identifier. Conveniently, the relationship identifier may be a key word, a name, or the like.

In one aspect, the relative delivery address as well as a textual message may be entered into a mobile phone. The relative delivery address and the message are

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wirelessly transmitted from the mobile phone to a message transfer server which

determines a phone number for a phone of the recipient. The message is the sent from the

message transfer server to the recipient phone. Optionally, the message may be in the

form of a first media type, and the message may be transformed to a second media type

5   prior to sending the message to the absolute delivery address. In another aspect, the

recipient may have multiple absolute delivery addresses that are associated with different

communication devices, and the relative delivery address may be resolved to at least

some of the multiple absolute delivery addresses. In still another aspect, the name of each

recipient and the associated absolute delivery address may be displayed, such as on a

10   display screen of a mobile phone, prior to sending the message.

The invention further provides an exemplary system to facilitate the

sending of a message between a sender and a recipient using a relative mail address. The

system comprises a resolution server which is configured to receive a transmitted

message having a relative recipient mail address from a sender mail server and to forward

15   the message to a recipient mail server. The relative recipient mail address includes a

relationship between the sender and the recipient. The system further includes code to

resolve the relative recipient mail address associated with the message to a recipient

absolute mail address. Code is also provided to forward the message to the recipient's

mail server based on the recipient absolute mail address. In this way, a sender may send a

20   message to one or more recipients without knowing the recipient's absolute mail address.

To do so, the user simply composes a relative recipient mail address and then sends the

address to the mail resolution server.

In one particular aspect, the system further includes code to extract an

absolute mail address of the sender from the message received by the mail resolution

25   server. Code is also provided to resolve the relative recipient mail address associated

with the message to the recipient's absolute mail address based on the sender's absolute

mail address and the relationship recited it in the relative recipient mail address.

Preferably, the system utilizes a database that is associated with the mail resolution

server. The database has fields for storing names, associated absolute mail addresses and

30   relationships between the names.

The invention further provides an exemplary computer readable medium

which contains a program for reading a relative address. The program includes the steps

of reading a relative delivery address which is associated with at least one recipient, and

receiving a message which is associated with the relative delivery address. The program

further includes the steps of resolving the relative delivery address to an absolute delivery address for each recipient, and of sending the message to each absolute delivery address. For example, the program may be used to determine a recipient's e-mail address or phone number.

5   In yet another embodiment, the invention provides an exemplary computer data signal which is embodied in a carrier wave. The signal comprises a mail address having a relationship identifier and a mail resolution server identifier. The signal further includes a message associated with the mail address.

           In one particular embodiment, a system is provided to facilitate the

10   sending of a message between a sender and a recipient using a relative delivery address. The system comprises a resolution server for receiving from a sender communication device a transmitted message having a relative recipient delivery address. The resolution server is also configured to forward the message to a recipient communication device. The relative recipient delivery address includes a relationship between the sender and the

15   recipient, and code is provided to resolve the relative recipient delivery address associated with the message to a recipient absolute delivery address. Code is also provided to forward the message to the recipient's communication device based on the recipient absolute delivery address. For example, the sender communication device and the recipient communication devices may comprise mobile phones, and code may be

20   provided to resolve the relative recipient delivery address to a phone number of the recipient phone so that the message may be sent to the recipient phone.

           In another embodiment, a method is provided for sending a message. According to the method, a communication device of an initiating individual is used to compose (or to permit the entry of) a relative delivery address which is associated with at

25   least one receiving individual. The relative delivery address is resolved to an absolute delivery address for a communication device of the receiving individual. A connection is then established between the initiating individual and the receiving individual using the communication devices to permit real time or live communication between the individuals.

30   In one aspect, the address composing step comprises entering the relative delivery address into a mobile phone of the initiating individual. Conveniently, the mobile phone may include a web browser which produces an entry page to facilitate entry of the relative delivery address. The relative delivery address may be wirelessly

transmitted from the mobile phone to a directory server which determines a phone number for a phone of the recipient. The recipient phone number may then be sent to the initiator phone which dials the recipient phone number to establish the connection.

In an alternative aspect, the relative delivery address may be transmitted from the phone of the initiating individual to an interactive voice response system having a directory server using a public switched telephone network. A phone number for the phone of the recipient may then be determined using the directory server, and a command may be sent from the directory server to the public switched telephone network to establish the connection between the recipient phone and the initiator phone.

The invention further provides a system to facilitate the communication between a sender and a recipient using a relative delivery address. The system includes a directory server which is adapted to receive from a sender communication device a relative recipient delivery address that is associated with a recipient communication device. The relative recipient delivery address includes a relationship between the sender and the recipient. Code is provided to resolve the relative recipient delivery address to a recipient absolute delivery address, and to send the absolute delivery address to a communication mechanism to establish a communication link between the sender communication device and the recipient communication device.

In one embodiment, the initiator communication device and the recipient communication device each comprise phones, and code is provided to resolve the relative recipient delivery address to a phone number of the recipient phone. Conveniently, the communication mechanism may comprise the initiator phone, and code may be provided to send the recipient phone number to the initiator phone to establish a wireless connection between the initiator phone and the recipient phone. Alternatively, the communication mechanism may comprise a public switched telephone network, and code may be provided to send the recipient phone number to the public switched telephone network to establish the connection.

In another embodiment, the invention provides a communication device that comprises a mobile phone having an entry device, a display screen and a web browser. The mobile phone is configured to send a relative delivery address to a server and to establish a connection with recipient phone upon receipt of a recipient phone number from the server.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram of an exemplary system to facilitate the sending of electronic mail according to the invention.

Fig. 2 is a flow chart illustrating an exemplary method for processing
5   electronic mail which utilizes a relative mail address according to the invention.

Fig. 3 is a flow chart illustrating an exemplary method for resolving a relative mail address to an absolute mail address according to the invention.

Fig. 4 is a schematic diagram illustrating a set of names in a database and how they relate to each other according to the invention.

10   Fig. 5 is a schematic diagram of a system to facilitate the wireless sending of messages according to the invention.

Fig. 6 is a schematic diagram of a system to provide live communication between to communication devices according to the invention.

Fig. 7 is a schematic diagram of an alternative system to provide live
15   communication between to communication devices according to the invention.

Fig. 8 illustrates the system of Fig. 7 when conferencing multiple telephones according to the invention.

DETAILED DESCRIPTION OF THE SPECIFIC EMBODIMENTS

20   The invention provides for the sending of mail or other messages of various media types to one or more recipients without requiring the sender to specify an absolute delivery address for each recipient. For example, when sending a traditional paper mail message, an absolute mail address is required which lists the recipient's name, residential address or P.O. box, city, state, country and zip or postal code. For e-mail
25   addresses, the absolute mail address typically includes the user's account ID followed by their assigned mail server and a top level domain as previously described. For phones, digital assistants, pagers, and the like, absolute addresses are phone numbers. The invention eliminates the need for such absolute delivery addresses to be provided by the sender in order to properly deliver a message or establish a communication link.

30   Although useful with essentially any type of mail or message, the invention will find particular use with electronic mail, or e-mail, which is sent over a network, including the Internet, local area networks, wireless networks, and the like. The invention will also find use in delivering messages to other communication devices, such as phones, including traditional phones, mobile phones, pagers, and the like. The invention may also be used

to establish a communication link between two or more communication devices using a relative delivery address to permit live communication, such as a conversation between two or more individuals over a phone.

According to one embodiment of the invention, mail or other messages are
5   addressed using a relative delivery address, such as a relative mail address, which is later resolved into an absolute address for each recipient. A relative delivery address is an address which is used to define on or more recipients without specifying an absolute delivery address of the recipients. For example, a relative mail address may utilize a relationship identifier which is used to identify one or more recipients. Conveniently, the
10   relationship identifiers may be used to figuratively represent sets of one or more recipients. Examples of possible relationship identifiers include key words or names, such as first names or nicknames, friends, family, siblings, brother, sister, neighbor, co-workers, and the like. As described in more detail hereinafter, the invention is able to associate the relationship identifier with absolute addresses, such as mailing address,
15   phone numbers, or the like, of recipients which belong to the relationship set, i.e., to resolve the relative address to one or more absolute addresses. In this way, the sender need not keep an accurate or updated list of absolute addresses for each recipient. Instead, the sender simply composes a relative delivery address using an intuitive or suggestive relationship identifier, e.g., friend, and the invention resolves the relative
20   address to the absolute address of each friend of the sender.

To conform with existing Internet procedures relative to domain names, the relative mail addresses preferably include a relationship identifier which identifies a desired name set, e.g., friend, followed by an at-sign, and further followed by the domain name of the server which is to receive the mail associated with the relative mail address.
25   Such a server is referred to as a mail resolution server. The mail resolution server resolves the relative address to one or more absolute mail addresses, and then transmits the mail to the appropriate recipient servers which will ultimately deliver to mail to the identified recipients. A similar process may be used with other communication devices. For example, mobile phones that include micro web browsers may use relative delivery
30   addresses that include a relationship identified following by the domain name of the server that is able to communication with a mobile phone. As another example, for mobile phones that include short message services, a relative address may be sent to a message relay server that resolves the address to a phone number of the recipient. As still another example, access to a resolution server may be accomplished through an

interactive voice response unit. The relative delivery address may be tailored to the configuration of the interactive voice response unit.

To resolve the relative delivery address to one or more absolute addresses, the invention preferably takes advantage of a computerized database. The databases

5   employed by the invention store a list of names of potential recipients and their associated absolute mail addresses. A variety of searching techniques may then be employed to identify the recipients intended by the sender when composing the relative mail address. For example, each name in the database may be associated with a list of associated names and corresponding relationship identifiers. When the sender composes the relative

10 delivery address, the names associated with the sender are then searched to find those names who have the same relationship identifier included in the relative delivery address. For example, a sender, Art Able, may wish to send a letter to "brothers". The set of names associated with Art Able are then searched to determine which of the names have "brother" as their relationship identifier. Once these names have been identified, their

15 associated absolute addresses may be determined.

As another example, the intended recipient or recipients may be inferred based on an evaluation of the relationship identifier and one or more relatives which are common with both the sender and the potential recipients. The common relatives may be a common blood relative or other type of defined relationship. For example, the database

20 may be arranged so that every name is associated with one or more parents. With this arrangement, if Art Able sends a letter to "brothers", the database searches to determine the siblings of Art Able by identifying the names having the same parents. The male names are then chosen as the desired recipients.

Although the above searching techniques are provided as examples, it will

25 be appreciated that the invention is not intended to be limited to only those specific techniques. For instance, other searching techniques which may be used with a relationship identifier include those described in Donald E. Knuth, The Art of Computer Programming, Volume 3, Sorting and Searching, the complete disclosure of which is herein incorporated by reference.

30 Use of such computerized databases are advantageous in that they are able to easily accommodate changes in absolute addresses. In this way, if an individual changes his or her absolute address, the change may be sent to the database administrator to make the change in the database. In this manner, the individual will not need to send an additional notification to each of his or her normal recipients.

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In one particular embodiment, the invention utilizes email systems which are based on a "store and forward" architecture. In such a system, messages are stored on servers which periodically forward them to the next server in the chain. Typically, new messages are sent when a user's client computer connects to its designated mail server.

5   That mail server looks at the destination address associated with the message and, depending on a set of rules, determines to which server the message should be relayed. This process may repeat depending on conditions such as periodic connectivity, relay schedules, and bridges between different networks or mail transport protocols. Eventually, the mail arrives at the receiver's mail server where it is held until the

10   receiver's client computer connects to retrieve the messages.

The most prevalent mail transport protocols currently in use are SMTP (primary protocol on the Internet), X.400, and Novell MHS. The relative mail addressing of the invention is applicable to these as well as other store and forward protocols.

Referring now to Fig. 1, an exemplary system 10 to facilitate the sending

15   of electronic mail according to the invention will be described. Central to system 10 is an address resolution server 12 which sits between a sender's mail server 14 and a receiver's mail server 16. A sender's computer 18 is employed to send email messages to sender's mail server 14, and a receiver's computer 20 is employed to receive email messages from receiver's mail server 16. While only shown with one sender's mail server, one

20   receiver's mail server, one sender's computer, and one receiver's computer, it will be appreciated that system 10 may have any number of similar components which may communicate with address resolution server 12. However, for convenience and illustration, only the previously recited components are shown. Also for convenience of discussion, the computers in Fig. 1 are ordered according to how the email message

25   moves through system 10. In terms of network connectivity, however, it is probable that all machines are peers on the Internet.

When a sender desires to send an email message, the sender composes a message and uses a relative mail address. Typically, the message will be composed at sender's computer 18. The relative address composed by the sender includes the domain

30   name of address resolution server 12. When the user sends the message, computer 18 delivers the message to mail server 14, typically a server at the user's Internet service provider. Sender's mail server 14 forwards the message to address resolution server 12 according to the domain name portion of the address.

Upon receiving the message, address resolution server 12 resolves the relative address to an absolute address. Address resolution server 12 is in communication with a member account and relationship data base 22 which is employed to assist in resolving the relative address to an absolute address as described in greater detail

5 hereinafter. After the absolute address has been determined, address resolution server 12 forwards the message on to receiver's mail server 16 based on the domain name portion of the new absolute mail address.

Receiver's mail server 16 holds the message until the receiver uses computer 20 to retrieve the message. Hence, when composing a mail message in this

10 manner, the relative mail address is transparent to all mail servers in system 10 except for address resolution server 12.

The computers employed to send and retrieve email messages may be of any type of computer capable of communicating with an external device or computer as is known in the art. For example, computers which may be utilized with the invention

15 include commercially available Pentium-type desktop or laptop computers, Apple Macintosh Computers, Palm Computers, Personal Digital Assistants, and the like. Preferably, these computers include appropriate software which allows email messages to be composed and allows one or more recipient's addresses to be entered, as is known in the art. Hence, the invention is not limited to the specific types of computers that may

20 communicate with mail servers.

The mail servers of the invention may comprise any type of commercially available mail server, such as SendMail (a public domain open-source mail server which is well known within the art) running on a Sun Microsystems Workstation. As such, the invention is not limited to the specific hardware or software included in the mail servers.

25 Further, depending on mail relay issues, there may be additional mail servers between sender's mail server 14 and address resolution server 12 or between address resolution server 12 and receiver's mail server 16.

Address resolution server 12 may be constructed of software code running on Microsoft Windows NT on a Multi-Processor Pentium-based computer. Alternatively,

30 server 12 may be constructed from code running on a Sun Microsystems Workstation.

A variety of data bases may be employed to construct data base 22. For example, data bases that may be employed may include Microsoft SQL Server, Oracle data bases, or Sybase data bases as are known in the art.

As previously described, when the sender composes the message, a relative mail address will be employed. The relative mail address includes the domain name of address resolution server 12. The relative mail address also preferably includes a relationship identifier which is the relative portion of the address. The relationship

5   identifier identifies one or more recipients that are to receive the message. One advantage of the invention is that the relationship identifier may be employed to identify essentially any type of relationship between the sender and the desired recipients. In this way, the sender does not need to know the absolute mail address for each of the desired recipients. Instead, the user need only craft the appropriate relationship identifier. Table 1 below

10   illustrates one example of the set of relationship identifiers followed by an @ sign which in turn is followed by the domain name of an address resolution server known as "dearfamily.com."

TABLE 1

Relative Address	Interpretation
mom@dearfamily.com	My mother.
siblings@dearfamily.com	All of my brothers and sisters.
cousins@dearfamily.com	All cousins, that is descendents of any of my parents' siblings.
bob@dearfamily.com	My closest relative named Bob or Robert.
aunt.jenny@dearfamily.com	A sibling of one of my parents whose name is Jenny or Jennifer.
all@dearfamily.com	All known relatives.
smiths@dearfamily.com	All relatives whose last name is Smith.
eric.driggs@dearfamily.com	A relative whose name is Eric Driggs.
mikes@dearfamily.com	All relatives named Mike or Michael.

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As illustrated in Table 1, the relationship identifiers may be used alone or in combination. When used in combination, the relationship identifiers are preferably separated by a period, although other separators may be used. If common nick names are

20   utilized as the relationship identifier, these may need to be resolved into a base name, such as "Bob" to "Robert" or "Jenny" to "Jennifer."

Referring now to Fig. 2, an exemplary method for processing electronic mail which utilizes a relative mail address will be described. The process begins at step 24 when a message is available to be processed. As shown in step 26, the message is received from the sending mail server. When the message has been received, the email

5   address of the sender is retrieved from the message headers. The retrieved email address of the sender is an absolute email address of the sender. A membership database, e.g., data base 22 of Fig. 1, is consulted to locate the sender's record based on the sender's email address as shown in step 28. As shown in step 30, if the sender was found in the membership database, the method proceeds to step 32. If not, the method proceeds to

10   step 34. In the event that the sender was not found in the membership database, a message is returned to the sender indicating the error. Processing of the message then ends as shown in step 36.

If the sender was found, the relative address is resolved to one or more absolute addresses using information in the membership data base. As shown in step 38,

15   if at least one match to the relative address was successfully found, the process proceeds to step 40. If not, the process proceeds to step 42. In step 42, no destination addresses were found, and a message is returned to the sender indicating the error. Processing of the message then ends at step 44. If one or more destination addresses are found, the message is forwarded to all destination servers and the processing ends at step 46.

20   Referring now to Fig. 3, an exemplary method for resolving a relative mail address to an absolute mail address will be described. The address resolution process begins at step 48. As shown at step 50, a destination address is read from one or more in-coming addresses. For example, the in-coming addresses may include "mom@dearfamily.com, dad@dearfamily.com." In step 50, the first name is read from

25   the list. As shown in step 52, a candidate set is then defined and includes all members related to the sender. This is preferably accomplished by initializing the candidate set to include all members who are related to the sender according to the membership data base. Importantly, the relationship between the sender and the members in the candidate set is not limited to a blood relationship. Rather, the term "related" is employed to mean those

30   people who are in some way connected to the sender as defined in the database.

The process then proceeds to step 54 where the first word in the destination address is read. This word is the relationship identifier. In some cases, the relative address may include a series of words that are delimited by some kind of separator. In the case of Internet mail (SMTP), the separator is usually a period. As

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shown in step 56, the word is evaluated to determine if the relationship identifier is a key word. Key words are special words that denote some kind of relationship. Examples of key words can include, but are not limited to, mom, dad, uncle, child, friend, co-worker, room mate, supervisor, secretary, and the like. If the word is a key word, the method

5   proceeds to step 58. If not, the process proceeds to step 60.

In step 58, all candidates that match the relationship are kept. If the word is not a key word, it is assumed that the word is a name. As shown in step 60, all candidates that match the name are kept. The name may either be the first or last name, and may also be a form of a name, e.g., Bob is equivalent to Robert.

10   As shown in step 62, if there are more words in the address, the process recycles back to step 54. If not, the process proceeds to step 64. All remaining members of the candidate set are added to a new destination address list. The process then proceeds to step 66 to determine if more addresses are in the list. If so, the process loops back to step 50. If not, the process proceeds to step 68 where the resolution process is

15   complete.

Referring now to Fig. 4, one example of how a candidate set may be initialized and then utilized to determine recipients which are intended to receive the message will be described. In Fig. 4, a candidate set 70 is illustrated. For convenience of discussion, the names in candidate set 70 are related by blood. However, as previously

20   described in connection with step 52 of Fig. 3, the invention is not limited to blood relationships. In practice, the membership database, such as database 22 of Fig. 1, will include a large number of candidate sets which are similar to set 70. When one of the members of candidate set 70 sends a message, the candidate set is initialized simply by determining all members in the data base which are related to the sender.

25   The data base which includes candidate set 70 is preferably configured to define all of the relationships between the members simply by knowing one or more parents of each name and the spouse (if available) for each of the names. Information included in such a data base is set forth in Table 2 below.

30   **TABLE 2**

Name	Absolute Address	Gender	Relationships
Art Able	AA@free.com	M	Parent: Bob Able Parent: Sandra Able Spouse: Jill Sorensen
Matthew Clark	Matt@zenith.net	M	Parent: Howard Clark Parent: Alison Jersey

			Spouse: Cecilia Jones
Cecilia Jones Clark	Celia@zenith.net	F	Parent: Orrin Jones Parent: Hazel Nelson Spouse: Matthew Clark
George Able	GA@home.com	M	Parent: Art Able Parent: Jill Sorensen Spouse: Lydia Clark
Lydia Clark Able	LCA@home.com	F	Parent: Matthew Clark Parent: Cecilia Jones Spouse: George Able
Ricky Able	Ricky@home.com	M	Parent: George Able Parent: Lydia Clark
Mary Able	MA@free.com	F	Parent: Art Able Parent: Jill Sorensen
John Able	John@fun.org	M	Parent: Art Able Parent: Jill Sorensen
Mary Clark	Mary@howzat.net	F	Parent: Matthew Clark Parent: Cecilia Jones

Merely to illustrate one way in which relative mail addresses involving candidate set 70 may be resolved into absolute addresses, the following examples are
5   provided. However, it will be appreciated that the invention is not intended to be limited to these specific examples, or to the specific configuration of the data base including candidate set 70.

In one example, the sender is George Able who composes the relative address of "dad". The relative address is translated by equating "dad" with the "father"
10 relationship and traversing that simple relationship. Once Art Able is identified, the associated absolute address of AA@free.com is extracted.

In another example, the sender is George Able who uses the relative address of "sister". The "sister" relationship is implied because Mary Able and George Able both list Art Able as their father. In a more general sense, the address is resolved by
15 finding all children of both parents and selecting the one that is female. Hence, the message is sent to Mary Able at MA@free.com.

In yet another example, the sender is Mary Able who uses the relative mail address of "brother". As with the "sister" relationship, the system selects all male individuals that list either of Mary Able's parents (Art Able or Jill Sorensen) as a parent.
20 This results in John Able and George Able being selected. Since "brother" is singular, and there were two matches, an error message listing the candidates may be generated. Alternatively, a dialogue message may be sent to Mary Able asking whether John Able or George Able is wanted. Mary Able may then indicate which of the brothers, if any, is desired. As a further note, although there is no direct record for Jill Sorensen, the process

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is not impaired. In this example, there are no half siblings, so all records match on both parents. However, a single parent match is considered to be sufficient. Also, in cases of adoption or step parents, there may be more than two parents listed.

In still yet another example, the sender is again Mary Able, and the

5   relative mail address is "brothers". This is the same as the previous example except that the plural form of "brothers" indicates that multiple matches are acceptable. As such, both John Able and George Able are selected and the message is sent to John@fun.org and GA@home.com.

In another example, the sender is George Able who composes a relative

10   address of "brother". In this case, both George Able and John Able are identified as male siblings of Art Able. However, George is eliminated from the candidate set because he is the sender. Hence, John is left as the only potential recipient so that the message may be sent to John@fun.org.

In still another example, the sender is John Able who sends a message to

15   the relative address of "Lydia". In this case, a name is employed rather than a key word. To resolve the name, all family members are searched to locate the one who has the specified name as one of their names. In this case, Lydia Clark Able is identified so that the message may be sent to LCA@home.com.

In another example, the sender is George Able who utilizes the relative

20   address of "Mary". This is similar to the previous example where the family database is searched to locate a matching name. However, in this case, there are two possible matches: Mary Able and Mary Clark. Mary Able is preferably chosen because a sister relationship is closer than a sister-in-law relationship.

In determining closeness of relationships, a variety of algorithms may be

25   employed. One possible algorithm is a weighting method which gives a weighting based on the number and type of links that must be traversed in order to reach the individual. A sibling relationship would have a weight of one because of the shared parent. A sibling-in-law would have a weight of two because the spouse and sibling relationships both have to be traversed. Another method is the expanding scope method where all individuals

30   within one link of the sender are selected. These individuals are then searched for a name match. If no name matches are found, all individuals within one link of the previous set (but not yet searched) are selected. The scope continues to expand until a match is found or some limit is reached.

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As another example, the sender is Ricky Able who utilizes a relative address of grandpa.able. This example uses both a key word and a name. First, the key word is used to select all candidates. In this case, grandpa selects all male parents of all parents. Then, the grandpa is selected for which one of the names is "Able". In this case,

5   Art Able is selected so that the message may be sent to AA@free.com.

In another example, the sender is George Able utilizing a relative mail address of "siblings". A key word of "siblings" is like "brothers" or "sisters" except that there is no gender constraint. Hence, all individuals with at least one parent are selected. In this case, both Mary Able and John Able are selected.

10   In still another example, the sender is George Able who utilizes the relative mail address of "brothers" and "sisters". This relative mail address also produces Mary Able and John Able as in the previous example. However, in this case, all brother and all sisters are found and the sets are then merged.

In a final example, the sender is George Able who utilizes the relative mail

15   address of "parents.of.wife". The "of" operator causes multiple relationships to be traversed in right to left order. Hence, the wife of George is first located, and then her parents are selected. As a result, both Matthew Clark and Cecilia Jones Clark are selected.

As previously mentioned, the above examples are provided merely to

20   illustrate how one can resolve relative names into absolute names. However, it will be appreciated that a variety of algorithms may be employed. Further, within family relationships, only a small subset of key words have been illustrated. Examples of other key words that may be included are "aunt," "uncle," "cousin," "niece," "nephew," "in-law" (modifier to parent, brother, or sister), "wife," "husband," "spouse," and the like.

25   Further, within other domains, other sets of key words may be used with corresponding algorithms. For example, a company may have "supervisor," "manager," "underlings," "president," "assistant," and the like.

The methods of the invention may be provided with a variety of enhancements or alterations depending on particular needs. As previously described,

30   names and/or key words can often include plurals. Preferably, the invention will reduce the names and/or key words to the singular form before matching. However, the fact that a plural was used may be flagged. Once the address resolution is complete, if there is more than one match and a plural was not used, then an error condition may be returned to the user instead of proceeding to send a message. For example, this would prevent

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sending the message to three "Bobs" when just the brother "Bob" was intended. As previously mentioned, a dialogue may be established with the sender to determine the correct recipient or recipients.

5   As an alternative, if a singular form was used and multiple matches were provided, the matches may be ranked according to closeness of the relationship. A message may then be sent to the sender indicating the closest match.

In some cases, a matching of words may be made sensitive to the position in the series of words. For example, if multiple names were used, the first might match first names while the last may match last names. A different matching algorithm may be

10   employed where all criteria are tested at once rather than the interactive process as previously described.

In another alternative, a special token in the address, such as a question mark, may be used to indicate that the server should return a list of all matching addresses to the sender rather than forwarding the message on. Use of such a token may be useful

15   for testing addresses before sending a message.

Another feature that may be utilized with the invention is a directory service feature. LDAP (lightweight directory access protocol) is growing in popularity as a protocol for accessing directory services. This protocol (as well as other similar protocols) may be used when a message is being composed to access a directory server.

20   Such an LDAP interface on the resolution server may be provided to allow a user to look at names using relative addresses before the message is sent. As one example, using the LDAP protocol, a user is able to enter a relative mail address and then view the resolved absolute mail addresses and the associated recipient name prior to sending the message. Such a feature allows the sender to visualize the absolute mail addresses and the recipient

25   prior to sending the message to ensure that the message is sent to the proper recipient.

The invention may also utilize a special indicator in the relative address, such as an exclamation point, to indicate that the server should expand the search for a name match beyond the members that are specifically related to the user in some way. A search may even be expanded to include known public directories using the LDAP

30   protocol. In such a case, the relative aspect of the address would preferably be limited to ranking matches based on some kind of "nearness" algorithm.

The invention may also be used with wireless devices as well as with the public telephone switching network. Merely by way of example, the invention may be used with mobile phones and personal digital assistants having embedded microbrowsers.

The address resolution techniques previously described may be used with such devices to transfer messages or to establish live communication links. For instance, relative address may be used with short message service (SMS), microbrowser directory access, interactive voice response (IVR), conference calling, voice messaging, and general

5   message delivery.

To enter relative addresses or messages into the devices of the invention, a variety of techniques may be used. Although most phones and wireless devices lack a full alphabetic keyboard, there are a number of ways of entering text using fewer keys. For example, a multipress method may be used where the letters printed on most

10   telephone keys are used to enter information. For example, the number 2 includes "a," "b," and "c." To enter the first letter the key is pressed once, for the second, twice, etc. To enter the number the key is pressed four times.

The predictive text method is similar to multipress. However, it reduces the number of keys per letter to one. As keys are pressed, it anticipates the correct word

15   out of all of the possible combinations of letters matching the keys that have been pressed. This is possible because there are a limited combination of letters corresponding to the numbers on a telephone pad that are meaningful and pronounceable. One such implementation is called "T9", available from Tegic systems and licensed to most mobile phone manufacturers. Such a systems is also described in U.S. Patent Nos. 5,818,437 and

20   5,953,541, the complete disclosures of which are herein incorporated by reference. In this system, the number keys are typed corresponding to the desired letters. By the time a word is completed it is usually correct. If not, pressing the 0 key allows one to cycle through the other possibilities.

The limited list method is similar to predictive text. However, in this case

25   the possibilities are limited by the current context. The user types the series of numbers corresponding to the letters of the desired text. The system then determines whether the numbers unambiguously identify one of the possible words.

Referring now to Fig. 5, a communication system 80 is shown which utilizes a short message service. System 80 includes an initiator mobile phone 82 and a

30   recipient mobile phone 84, it being appreciated that multiple recipient phones may be used. Messages are transferred from phone 82 to phone 84 using a Short Message Service (SMS). The SMS is presently popular on mobile phones in certain European countries. In essence, SMS allows an individual to enter a short textual message into

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phone 82 and send it to one or more other phones 84. Recipient phones 84 are addressed using their phone number.

Relative addressing as previously described is applied to the Short Message Service by allowing individuals to use relative addresses as the destination of

5   messages. More specifically, a relative delivery address is input into phone 82. For example, the relative delivery address may be any kind of key work, such as "mom". Conveniently, the relative addresses may be offered through a partnership with a wireless service provider, and the relative address may be distinguished from an absolute phone number by being textual instead of numeric. Using methods similar to relative e-mail

10   addressing as previously described, the relative addresses are resolved to absolute phone numbers by a message relay server 86 and then forwarded on to the recipient phone 84.

Relative addressing may also be used to establish a communication link between two or more phones for live communication. For example, the majority of personal wireless data devices are mobile phones. Many of these include a microbrowser

15   which is similar to a web browser but limited to a small display and with limited features. The microbrowsers on many of these devices allow links to telephone numbers. Thus, such devices may be used to access a directory service using such a link to retrieve a telephone number and then place a voice call. The directory service may be configured to resolve relative addresses into phone numbers to permit connections to be established.

20   One such communication system 88 is shown in Fig. 6. Communication system 88 has an initiator mobile phone 90 and a recipient mobile phone 92. Phone 90 includes a display screen and a microbrowser which is similar to a traditional web browser but limited to a small display and with limited features. Conveniently, the microbrowser may allow links to telephone numbers. Thus, phone 90 may access a

25   directory service server computer 94 using such a link to retrieve a telephone number and then place a voice call to phone 92.

Relative addressing may be used to place the call to phone 92 (or to multiple phones) using the microbrowser by first having the user to identify him/herself. In some cases, mobile phone 92 may be configured to identify itself, and server 94 may

30   be configured to assume that the user is the registered owner of the phone. The user then specifies the relative address of someone he/she would like to call, i.e. by textual entry or voice entry. For example, the relative address may simply be the name of an individual, e.g., Bob, or a relation, e.g. co-worker. The relative address is sent to server 94 where the directory service resolves the relative address to an absolute individual and their phone

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number using any of the techniques previously described. Server 94 returns the telephone number to phone 90 which connects directly to the destination number of phone 92. This may be accomplished by configuring phone 90 to automatically dial the number, or to display the number and permit the user to dial. Conveniently, the name and phone
5   number corresponding to phone 92 may be displayed on the display screen using the web browser.

Shown in Fig. 7 is an alternative communication system 96 which uses relative addresses to permit live communication between an initiator phone 98 and a recipient phone 100. This concept is similar to the system of Fig. 6 as just described
10   except that an interactive voice response (IVR) system 120 is used. With IVR, no special features are required on the phone and it is equally applicable to wired and wireless phones.

To place a phone call using relative addressing, the user dials an access number which is answered by an IVR voice prompt generated by system 120. The user
15   identifies him/herself either using voice (e.g. speaking his/her name) or by typing a personal identification number on the keypad of phone 98. Conveniently, IVR system 120 may be used to authenticate individuals using voiceprint analysis. Alternatively, system 120 might identify the user by using a caller ID and a reverse directory lookup.

The user speaks the keyword or name of the individual he/she wants to
20   call, i.e. the relative address. Alternatively, the keyword or name may be entered into the phone keypad using multipress or limited list techniques as previously described. IVR system 120 accesses a directory which resolves the target relative address to an absolute address. Optionally, system 120 may confirm the matching individual with the user. IVR system 120 includes a directory server which commands a public switched telephone
25   network to transfer the call to the target individual's phone number, i.e. to phone 100.

As shown in Fig. 8, system 96 may be used to place conference calls. More specifically, multiple absolute addresses may be specified, either by using multiple relative addresses or using a relative address that resolves to multiple absolute addresses. A conference call is then established between the caller and all addressees in a manner
30   similar to that just described.

For example, the specified address may be "brothers and sisters". System 120 may be used to resolve to the phone numbers of all brothers and all sisters of the caller. A command may then be given to connect phones 100 to phone 98.

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The relative addressing techniques of the invention may also be used with Internet or other network services that are capable of delivering a message using a variety of communication devices in a variety of media types. For example, the service may be configured deliver a text message to mix of phones (through voice synthesis), pagers,

5   email addresses, or fax machines. One example of such a service is MessageBlaster (http://www.messageblaster.com).

The invention may utilize a message transfer server having a general purpose directory that lists several addresses of different types for each individual (e.g. phone number, fax number, e-mail, pager, or the like). In any of the messaging-style

10   techniques previously described, e.g., use of e-mail, Short Message Service, voice messaging, the message transfer server may be configured to look up the target individual in the directory and then deliver the message to the address using the same kind of messaging system.

A general message delivery system may also use a mix of message types,

15   message urgency, available recipient addresses (e.g. phone number but no fax), and recipient preferences to determine what kind of system should be used to deliver the message. The message may then be translated into an appropriate form for the target address. For example, voice synthesis could be used to translate from text to voice messaging.

20   The invention has now been described in detail for purposes of clarity and understanding. However, it will be appreciated that certain changes and modifications may be practiced within the scope of the claimed invention.

WHAT IS CLAIMED IS:

1. A method for sending a message, comprising:

composing a relative delivery address which is associated with at least one recipient;

associating a message with the relative delivery address;

resolving the relative delivery address to an absolute delivery address for each recipient; and

sending the message to each absolute delivery address.

2. A method as in claim 1, wherein the address composing step comprises entering the relative delivery address into a mobile phone, and wherein the message associating step comprises entering a textual message into the mobile phone.

3. A method as in claim 2, further comprising wirelessly transmitting the relative delivery address and the message from the mobile phone to a message transfer server, wherein the resolving step comprising determining a phone number for a phone of the recipient using the message transfer server, and wherein the message sending step comprises sending the message from the message transfer server to the recipient phone.

4. A method as in claim 1, wherein the message is in the form of a first media type, and further comprising transforming the message to a second media type prior to sending the message to the absolute delivery address.

5. A method as in claim 1, wherein the recipient has multiple absolute delivery addresses that are associated with different communication devices, and further comprising resolving the relative delivery address to at least some of the multiple absolute delivery addresses.

6. A method as in claim 1, further comprising displaying the name of each recipient and the associated absolute delivery address prior to sending the message.

7. A method as in claim 1, wherein the resolving step comprises providing a set of names, with each name being associated with at least one common relative; determining the name of a sender of the message; and identifying one or more recipients based at least in part on the common relative and information in the relative delivery address.

8. A method for resolving a relative delivery address to an absolute delivery address, the method comprising:

providing a set of names, with each name having an associated absolute delivery address and at least one relationship identifier indicating a relation with one or more of the names in the set;

receiving a relative delivery address having a sender's name and a relationship identifier;

determining a candidate name set from the set of names based at least in part on the sender's name;

comparing the relative delivery address relationship identifier with each name in the candidate name set to determine one or more recipients; and

identifying the absolute delivery address for each recipient.

9. A method as in claim 8, wherein the candidate set is determined based on a common relationship between the sender and the set of names.

10. A method for sending a message, comprising:

providing a set of names, with each name being associated with at least one common relative in the set of names;

receiving a message from a sender phone, the message having a relative delivery address which is associated with at least one recipient phone number and includes a relationship identifier;

identifying one or more recipients based at least in part on the relationship identifier and the common relative; and

sending the message to the recipient phone.

11. A method as in claim 10, wherein the common relative is a blood relative

12. A system to facilitate the sending of a message between a sender and a recipient using a relative delivery address, the system comprising:

a resolution server which is adapted to receive from a sender communication device a transmitted message having a relative recipient delivery address and to forward the message to a recipient communication device, wherein the relative recipient delivery address includes a relationship between the sender and the recipient;

code to resolve the relative recipient delivery address associated with the message to a recipient absolute delivery address; and

code to forward the message to the recipient's communication device based on the recipient absolute delivery address.

13. A system as in claim 12, wherein the sender communication device and the recipient communication devices comprise mobile phones, and further comprising code to resolve the relative recipient delivery address to a phone number of the recipient phone.

14. A system as in claim 12, wherein the message is in the form of a first media type, and further comprising code to transform the message to a second media type prior to sending the message to the absolute delivery address.

15. A system as in claim 13, further comprising code to extract a telephone number of the sender from the message received by the resolution server, and code to resolve the relative recipient delivery address associated with the message to the recipient's phone number based on the sender's phone number and the relationship recited in the relative recipient delivery.

16. A system as in claim 12, further comprising a database associated with the mail resolution server, the database having fields for storing names, associated absolute delivery addresses and relationships between the names.

17. A computer readable medium containing a program for reading a delivery address comprising the steps of:

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reading a relative delivery address which is associated with at least one recipient;

receiving a message which is associated with the relative delivery address;

resolving the relative delivery address to an absolute delivery address for each recipient; and

sending the message to each absolute delivery address.

18. A computer readable medium as in claim 17, wherein the absolute delivery address comprises a mobile phone number.

19. A method for sending a message, comprising:

at a communication device of an initiating individual, composing a relative delivery address which is associated with at least one receiving individual;

resolving the relative delivery address to an absolute delivery address for a communication device of the receiving individual; and

establishing a connection for real time communication between the initiating individual and the receiving individual using the communication devices.

20. A method as in claim 19, wherein the communication devices comprise phones, and wherein the communication comprises verbal messages between the individuals.

21. A method as in claim 20, wherein the phones comprise mobile phones, and wherein the connection comprises a wireless connection.

22. A method as in claim 20, wherein the connection is established over a public switched telephone network.

23. A method as in claim 19, wherein the connection is established between the initiating individual and only one receiving individual.

24. A method as in claim 19, further comprising establishing connections between the initiating individual and multiple receiving individuals.

25. A method as in claim 19, wherein the address composing step comprises entering the relative delivery address into a mobile phone of the initiating individual.

26. A method as in claim 25, wherein the mobile phone includes a web browser, and further comprising producing an entry page using the web browser to facilitate entry of the relative delivery address.

27. A method as in claim 25, further comprising wirelessly transmitting the relative delivery address from the mobile phone to a directory server, wherein the resolving step comprises determining a phone number for a phone of the recipient using the delivery server, and wherein the connection establishing step comprises sending the recipient phone number to the initiator phone, and dialing the recipient phone number using the initiator phone.

28. A method as in claim 19, wherein the communication devices comprise phones, wherein the address composing step comprises entering the relative delivery address into the phone of the initiating individual.

29. A method as in claim 28, further comprising transmitting the relative delivery address from the phone of the initiating individual to an interactive voice response system having a directory server using a public switched telephone network, wherein the resolving step comprises determining a phone number for the phone of the recipient using the delivery server, and wherein the connection establishing step comprises sending a command from the delivery server to the public switched telephone network to establish the connection between the recipient phone number to the initiator phone.

30. A method as in claim 19, wherein the communication is in the form of a first media type, and further comprising transforming the communication to a second media type.

31. A method for establishing a communication link between a phone of an initiator and a phone of at least one recipient, comprising:

providing a set of names, with each name being associated with at least one common relative in the set of names;

receiving a relative delivery address from an initiator phone which is associated with at least one recipient phone number and includes a relationship identifier;

identifying one or more recipient phone numbers based at least in part on the relationship identifier and the common relative; and

using the recipient phone number to establish a communication link between the initiator phone and the recipient phone.

32. A method as in claim 31, further comprising sending the recipient phone number to the initiator phone to permit the initiator phone to establish the connection.

33. A method as in claim 31, further comprising sending the recipient phone number to a public switched telephone network to establish the connection.

34. A method for establishing a communication link between a phone of an initiator and a phone of at least one recipient, comprising:

at a directory server, receiving a relative delivery address from an initiator phone which is associated with at least one recipient phone number;

identifying one or more recipient phone numbers using the directory server; and

using the recipient phone number to establish a communication link between the initiator phone and the recipient phone.

35. A method as in claim 34, further comprising sending the recipient phone number to the initiator phone to permit the initiator phone to establish the connection.

36. A method as in claim 34, further comprising sending the recipient phone number to a public switched telephone network to establish the connection.

37. A system to facilitate the communication between a sender and a recipient using a relative delivery address, the system comprising:

a directory server which is adapted to receive from a sender communication device a relative recipient delivery address that is associated with a recipient communication device, wherein the relative recipient delivery address includes a relationship between the sender and the recipient;

code to resolve the relative recipient delivery address to a recipient absolute delivery address; and

code to send the absolute delivery address to a communication mechanism to established a communication link between the sender communication device and the recipient communication device.

38. A system as in claim 37, wherein the initiator communication device and the recipient communication device each comprise phones, and further comprising code to resolve the relative recipient delivery address to a phone number of the recipient phone.

39. A system as in claim 38, wherein the communication mechanism comprises the initiator phone, and further comprising code to sent the recipient phone number to the initiator phone to establish a wireless connection between the initiator phone and the recipient phone.

40. A system as in claim 38, wherein the communication mechanism comprises a public switched telephone network, and further comprising code to send the recipient phone number to the public switched telephone network.

41. A system as in claim 38, wherein the initiator phone includes a web browser, and wherein the directory server is configured to send and receive web documents to and from the to and from the initiator phone.

42. A communication device comprising:

a mobile phone having an entry device, a display screen and a web browser, wherein the mobile phone is configured to send an entered relative delivery

address to a server and to establish a connection with recipient phone upon receipt of a recipient phone number from the server.

      43. A method for sending a message, comprising:

      composing a relative mail address which is associated with at least one recipient;

      associating a message with the relative mail address;

      resolving the relative mail address to an absolute mail address for each recipient; and

      sending the message to each absolute mail address.

      44. A method as in claim 43, wherein the resolving step comprises providing a set of names, with each name being associated with at least one common relative; determining the name of a sender of the message; and identifying one or more recipients based at least in part on the common relative and information in the relative mail address.

      45. A method as in claim 44, wherein the common relative is a blood relative, and wherein the relative mail address includes a relationship identifier which includes an identification of the recipient's gender.

      46. A method as in claim 43, wherein the relative mail address is an e-mail address comprising a relationship identifier and a mail resolution server identifier, and further comprising sending the message to a mail resolution server identified by the mail resolution server identifier.

      47. A method as in claim 46, wherein the resolving step comprises determining the name of a sender of the message, identifying a candidate set of names that are associated with the sender, and identifying members of the candidate set which have a relationship with the sender that is the same as the relationship identified by the relationship identifier.

48. A method as in claim 47, wherein the relationship identifier is a keyword or a name.

49. A method as in claim 47, further comprising identifying the absolute mail address that is associated with each identified member of the candidate set.

50. A method for resolving a relative mail address to an absolute mail address, the method comprising:

providing a set of names, with each name having an associated absolute mail address and at least one relationship identifier indicating a relation with one or more of the names in the set;

receiving a relative mail address having a sender's name and a relationship identifier;

identifying one or more recipients based at least in part on the sender's name and the relationship identifier; and

identifying the absolute mail address for each identified recipient.

51. A method as in claim 50, wherein the identifying the recipient step comprises inferring one or more recipients based on related relationships in the set of names.

52. A method as in claim 50, wherein the step of identifying one or more recipients comprises:

determining a candidate name set from the set of names based on the sender's name;

comparing the relative mail address relationship identifier with the relationship identifiers of each name in the candidate name set; and

identifying the absolute mail address for the name or names in the candidate set which has the same relationship identifier as the relative mail address relationship identifier.

53. A method for resolving a relative mail address to an absolute mail address, the method comprising:

providing a set of names, with each name having an associated absolute mail address and at least one relationship identifier indicating a relation with one or more of the names in the set;

receiving a relative mail address having a sender's name and a relationship identifier;

determining a candidate name set from the set of names based at least in part on the sender's name;

comparing the relative mail address relationship identifier with each name in the candidate name set to determine one or more recipients; and

identifying the absolute mail address for each recipient.

54. A method as in claim 53, wherein the candidate set is determined based on a common relationship between the sender and the set of names.

55. A method for sending a mail message, comprising:

providing a set of names, with each name being associated with at least one common relative in the set of names;

receiving a mail message from a sender, the mail message having a relative mail address which is associated with at least one recipient and includes a relationship identifier;

identifying one or more recipients based at least in part on the relationship identifier and the common relative; and

sending the mail message to the recipient.

56. A method as in claim 55, wherein the common relative is a blood relative.

57. A system to facilitate the sending of a message between a sender and a recipient using a relative mail address, the system comprising:

a mail resolution server which is adapted to receive an electronic message having a relative recipient mail address from a sender mail server and to forward the message to a recipient mail server, wherein the relative recipient mail address includes a relationship between the sender and the recipient;

code to resolve the relative recipient mail address associated with the message to a recipient absolute mail address; and

code to forward the message to the recipient's mail server based on the recipient absolute mail address.

58. A system as in claim 57, further comprising code to extract an absolute mail address of the sender from the message received by the mail resolution server, and code to resolve the relative recipient mail address associated with the message to the recipient's absolute mail address based on the sender's absolute mail address and the relationship recited in the relative recipient mail address.

59. A system as in claim 57, further comprising a database associated with the mail resolution server, the database having fields for storing names, associated absolute mail addresses and relationships between the names.

60. An apparatus to facilitate the sending of a message between a sender and a recipient using a relative mail address, the apparatus comprising:

a mail resolution server which is adapted to receive an electronic message having a relative recipient mail address from a sender mail server and to forward the message to a recipient mail server, wherein the relative recipient mail address includes a relationship between the sender and the recipient;

code to extract an absolute mail address of the sender from the message received by the mail resolution server;

code to resolve the relative recipient mail address associated with the message to a recipient absolute mail address based on the sender's absolute mail address and the relationship recited in the relative recipient mail address; and

code to forward the message to the recipient's mail server based on the recipient absolute mail address.

61. A computer readable medium containing a program for reading a mail address comprising the steps of:

reading a relative mail address which is associated with at least one recipient;

receiving a message which is associated with the relative mail address;

33 :

resolving the relative mail address to an absolute mail address for each recipient; and

sending the message to each absolute mail address.

62. A computer data signal embodied in a carrier wave, comprising:

a mail address having a relationship identifier and a mail resolution server identifier; and

a message associated with the mail address.

63. A computer data signal as in claim 62, further comprising an absolute mail address of a sender of the message.

64. A method as in claim 43, further comprising displaying the name of each recipient and the associated absolute mail address prior to sending the message.
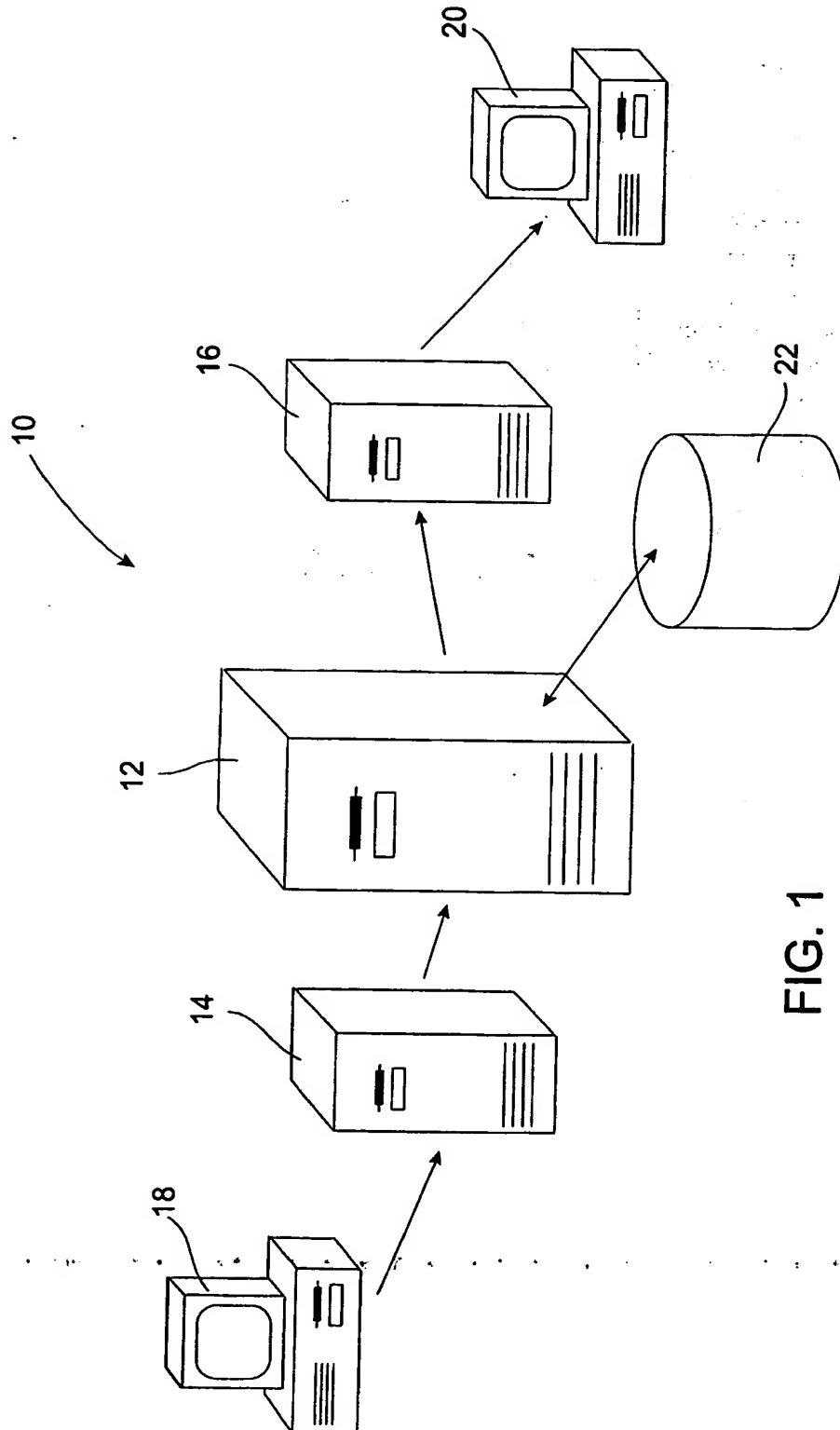
65. A method as in claim 50, further comprising displaying the names of the recipients and their associated absolute mail addresses.

66. A method as in claim 55, further comprising displaying the name of each recipient and the associated absolute mail address prior to sending the message.
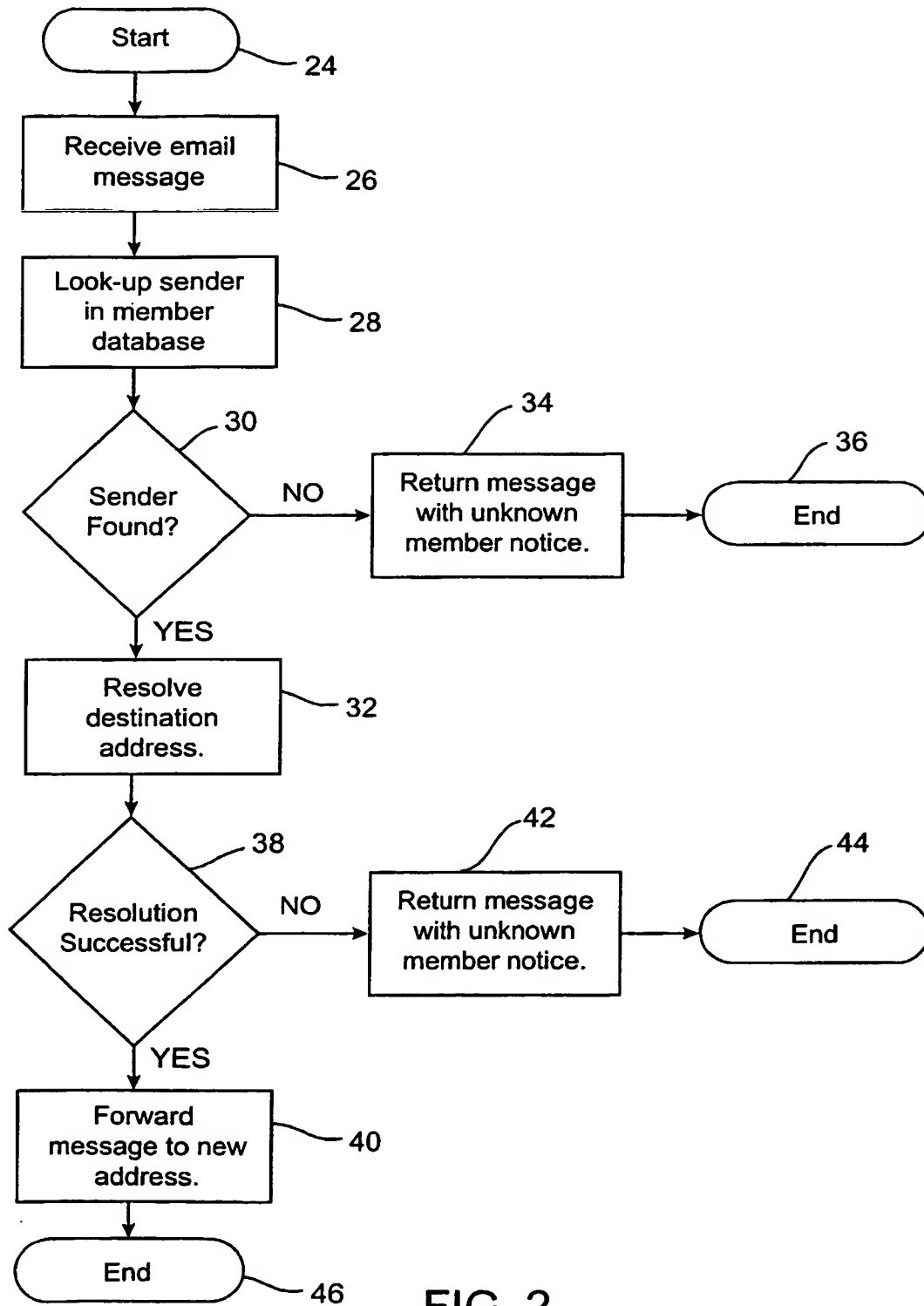
1 / 4

FIG. 1

FIG. 2

Start
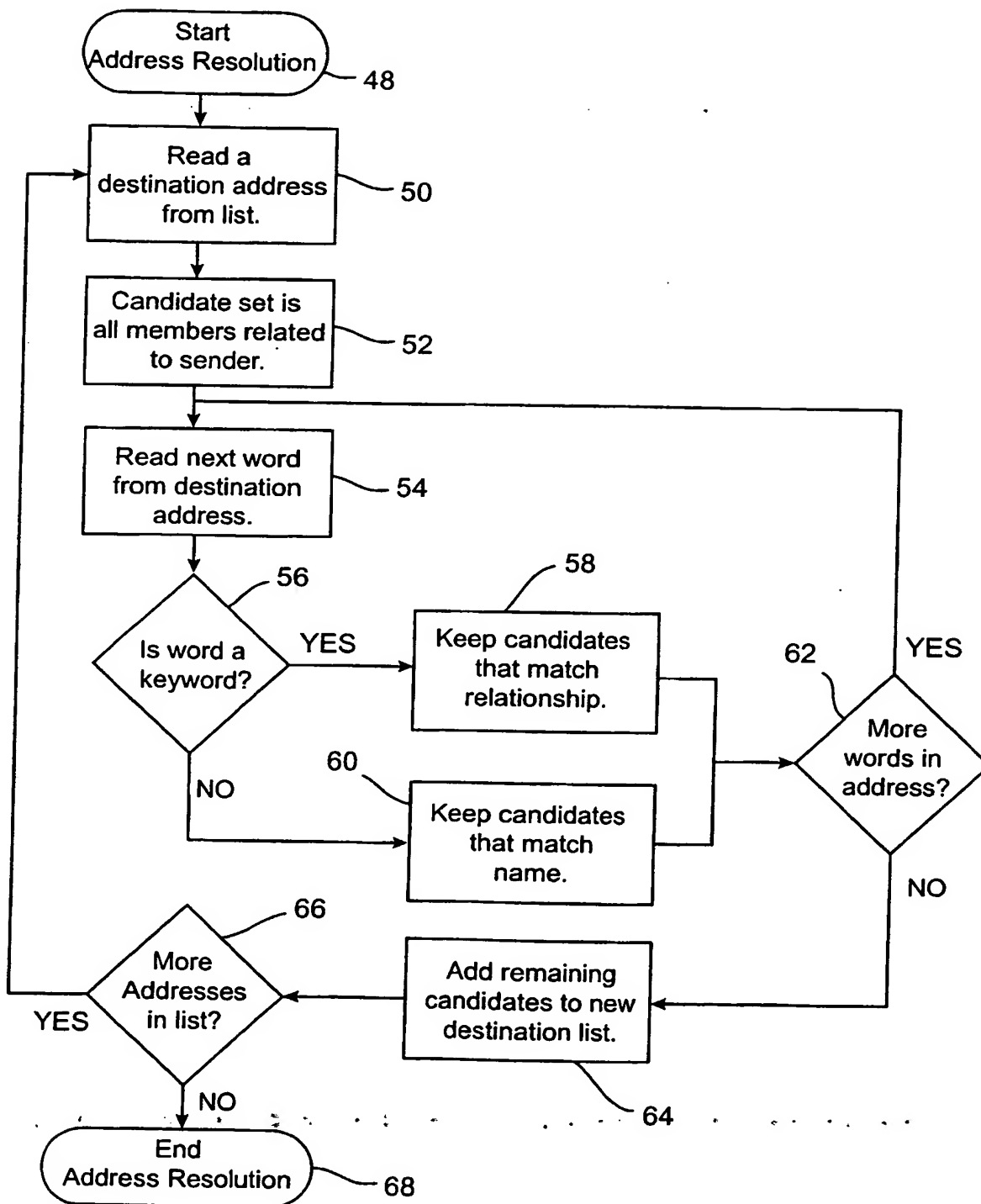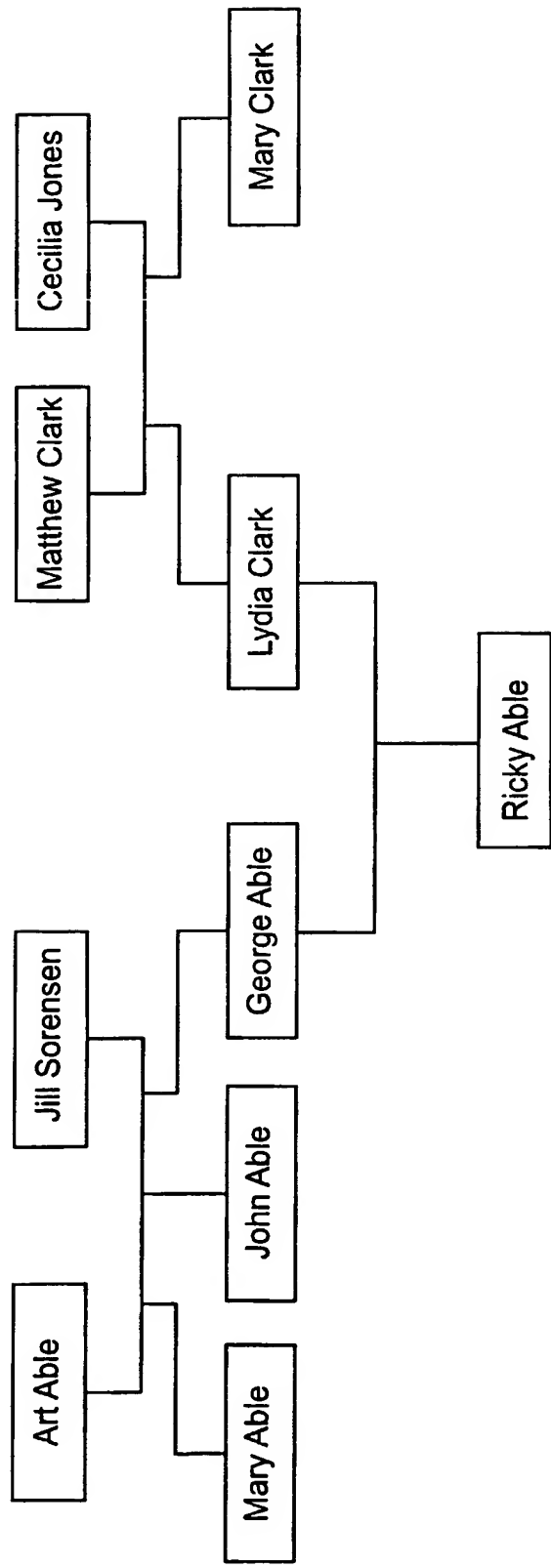Address Resolution — 48

Read a
destination address — 50
from list.

Candidate set is
all members related — 52
to sender.

Read next word
from destination — 54
address.

56
Is word a
keyword?

YES → Keep candidates
that match — 58
relationship.

NO

60
Keep candidates
that match
name.

62
More
words in
address?

YES

NO

Add remaining
candidates to new
destination list. — 64

66
More
Addresses
in list?

YES

NO

End
Address Resolution — 68

FIG. 3

FIG. 4

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 15/16; H04M 1/56, 11/00

US CL   :709/206, 227, 228

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/204, 205, 206, 227, 228; 379/67.1, 88.01, 88.04, 88.17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

.EAST patent text search

Terms: message address resolving, group name/alias, phone/distribution list broadcast

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	US 6,212,552 B1 (BILIRIS et al.) 03 APRIL 2001 Abstract, Column 2, Lines 15-49, Column 3, Lines 15-67, Column 4, Line 51 through Column 7, Line 60	1, 4-6, 8-12, 16-18, 31-40, 43-66
Y, P		2-3, 7, 13-15, 19-30, 41-42
Y	US 5,742,905 A (PEPE et al.) 21 APRIL 1998 Abstract, Column 3, Lines 27-42, Column 4, Lines 56-67, Column 5, Line 27 through Column 6, Line 51, Column 7, Lines 22-59, Column 23, Lines 12-62, Column 29, Line 26 through Column 30, Line 27	2-3, 7, 13-15, 19-30, 41-42

[X] Further documents are listed in the continuation of Box C.   [ ] See patent family annex.

*   Special categories of cited documents:

"A"   document defining the general state of the art which is not considered to be of particular relevance

"E"   earlier document published on or after the international filing date

"L"   document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O"   document referring to an oral disclosure, use, exhibition or other means

"P"   document published prior to the international filing date but later than the priority date claimed

"T"   later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"   document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"   document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"   document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 JANUARY 2002	13 FEB 2002

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	MARC THOMPSON
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INTERNATIONAL SEARCH REPORT

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,621,727 A (VAUDREUIL) 15 APRIL 1997 Entire document	1-66
A	US 5,923,848 A (GOODHAND et al.) 13 JULY 1999 Entire document	1-66
A,E	US 6,185,288 B1 (WONG) 06 FEBRUARY 2001 Entire document	1-66

INTERNATIONAL SEARCH REPORT

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

   Please See Extra Sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest   ☐ The additional search fees were accompanied by the applicant's protest.

                             ☒ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet(1)) (July 1998)*

INTERNATIONAL SEARCH REPORT

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING
This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claim(s) 1-30, 37-41, and 43-66, is drawn to facilitation of sending a message by resolving a relative address (i.e., alias) to an absolute (i.e., unique) address.

Group II, claim(s) 31-36 and 42, is drawn to establishing a communication link (connection establishment) between two network devices (i.e., initiator and recipient).

The inventions listed as Groups I and II do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The invention groups are drawn towards divergent, distinctly different inventions. Functionality for facilitating the sending of a message by resolving a relative delivery address to an absolute delivery address does not necessarily involve the establishing of a communication link between network elements, e.g., an initiator and a recipient. Likewise, establishment of a connection between netowrk elements do not necessarily involve the resolution of alias address(es). Thus, the two groups do not share a common inventive concept.

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